MICROLEPIDOPTERA

By LORD WALSINGHAM

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FAUNA HAWAIIENSIS

OR THE

ZOOLOGY OF THE SANDWICH (HAWAIIAN) ISLES:

Being Results of the Explorations instituted by the Joint Committee appointed by

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VOLUME I. PART V.

MICROLEPIDOPTERA

By The Right Hon. LORD WALSINGHAM, M.A., LL.D., F.R.S.

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MICROLEPIDOPTERA.

By the Right Hon. Lord Walsingham, M.A., LL.D., F.R.S.

I. *PYRALIDINA.*

I. Fam. PYRAUSTIDAE*.

1. LINEODES Gn.

Type *Lineodes hieroglyphalis* Gn. (Hmsn.).

LINEODES Gn., Sp. Lp. VIII. (Delt. Pyr.) 234 (1854); Wkr., Cat. Lp. BM. XVII. 409 (1859); Fern., Mass. Agr. Coll. Ann. Rp. XXXV. 90 [=sep. 8] (1898); Wlsm., Ent. Mo. Mag. XXXIV. 191 (1898); Hmsn., Pr. Z. Soc. Lond. 1898, 592, 603, No. 160: 1899, 283—4, No. 160, fig. 160.

=*SCOPTONOMA* Z., Verh. ZB. Ges. Wien. XXIII. (1873), Abh. 327—8 (1873); Meyr., Tr. Ent. Soc. Lond. 1886, 2.

1. (1) *Lineodes ochrea*, sp. nov. (Pl. X. fig. 1).

Antennae pale yellowish cinereous. Palpi ochreous, sprinkled with greyish fuscous externally. Head and Thorax greyish fuscous, mixed with ochreous and pale cinereous scales. Forewings pale brownish ochreous, sprinkled with greyish fuscous scales on a short basal patch, produced along the dorsum, where the dark sprinkling becomes thicker and is dilated outward and upward nearly to the middle, forming, with a thinner sprinkling on the costa before the middle, an ill-defined broad band interrupted by a narrow pale cinereous space along the cell; this is extended outward, gradually widened towards the apex, which it does not reach, and is interrupted by an irregular broad greyish fuscous band, obliquely placed, crossing the end of the cell, but not reaching to the costa or dorsum; its upper and lower margins are produced respectively in narrow greyish fuscous lines which meet and enclose the outer end of the pale cinereous space which obviously represents the upper fold of the wing; above it are three or four greyish fuscous costal spots; a greyish fuscous terminal band precedes the pale cinereous cilia through which runs along their middle a somewhat broken greyish fuscous line. Exp. al. 22—26 mm. Hindwings and cilia pale cinereous, with some slightly darker mottlings beyond the cell and along the dorsum. Abdomen brownish ochreous, much sprinkled with greyish fuscous. Legs pale cinereous, the posterior ends of the tibiae sprinkled with greyish fuscous.

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* I retained the genus *Lineodes*, of which I possessed a fairly representative collection, owing to its having been originally included in the *Pterophorina*; for this reason Mr Meyrick did not deal with *Lineodes* in treating of the *Pyraustidae* to which family it belongs. WLSM.

Type ♀ (26723) *Kauai*, Mus. Wlsm.

HAB. KAUAI: 3000—4000 ft., IV. 1894; Kaholuamano, 4000 ft., IV. 1895.—HAWAII: Kona, 4000 ft., VII. 1892; Olaa, VII. 1895; Hilo, 2000 ft., XII. 1895. Ten specimens.

This species resembles *Lineodes interrupta*, Z., especially in the central and outer shades being separated at the costa, but it differs in its ochreous colouring and in the pattern of the outer markings.

2. (2) *Lineodes subextincta*, sp. nov. (Pl. X. fig. 2).

Antennae cinereous. Palpi projecting more than the length of the head beyond it; greyish fuscous. Head greyish fuscous, with a small whitish spot on either side behind the base of the antennae. Thorax greyish fuscous, mixed with cinereous and fawn-brown scales; tegulae with long hair-like scales at their extremities. Forewings cinereous, thickly dusted with greyish fuscous, especially along the dorsal half, with a slight admixture of fawn-brown on the costal half before the middle and in a pale subterminal band; the only markings that are traceable are a greyish fuscous shade before the middle, crossing the upper fold obliquely backward from the costa and reaching the dorsum at about one-third of the wing-length (in some specimens this is almost entirely lost in the greyish fuscous suffusion); a broad irregular somewhat triangular patch embracing the outer extremity of the cell extends to the costa a little before the apex, but its lower angle does not reach the dorsum, the basal portion of this triangle is somewhat darker through the more thickly packed greyish fuscous scales than its outer portion, except a narrow marginal line running parallel with the termen; four dark costal spots precede the apex and a narrow reduplicated greyish fuscous band follows the termen from apex to tornus embracing the basal half of the pale cinereous cilia, which are also tipped with greyish fuscous, except on the lower third of the margin. Exp. al. 21—25 mm. Hindwings pale cinereous, with a broad mottled band following the outer margin; cilia pale cinereous. Abdomen greyish fuscous, sprinkled with cinereous, with two whitish lateral spots at the extreme base. Hind Legs pale cinereous, the tibiae slightly clouded.

Type ♂ (26060) *Molokai*, Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895; Mts., 3000—4000 ft., X. 1895.—MOLOKAI: 3000 ft., 17 VI. 1893.—HAWAII: Kona, 4000 ft., 8 IX. 1892. Four specimens.

II. *PTEROPHORINA.*

2. TRICHOPTILUS Wlsm.

Type *Trichoptilus pygmaeus* Wlsm. (Wlsm. 1880).

TRICHOPTILUS Wlsm., Pter. Cal.—Or. 62—3 (1880); Meyr., Tr. Ent. Soc. Lond. 1886, 7: 1890, 484—5; Tutt, Br. Nat. I. 252—3 [*reprint* 77—8] (1891); Meyr., HB. Br. Lp. 430—1 (1895); O. Hfm., Ber. NW. Ver. Regensb. v. 45, 49, 145—6, 206 (1896); Fern., Mass. Agr. Coll. Ann. Rp. XXXV. 95—6 [sep. 13—14] (1898).

3. (1) *Trichoptilus oxydactylus* Wkr. (Pl. X. fig. 3).

n. synn. = *hawaiiensis* Btl., = *centetes* Meyr.

Pterophorus oxydactylus Wkr., Cat. Lp. Ins. BM. XXX. 944 (1864)[1]. *Aciptilia hawaiiensis* Btl., Ann. and Mag. NH. (5.s.) VII. 408 (1881)[2]. *Aciptilia oxydactyla* Wlsm., Pr. Z. Soc. Lond. 1885, 885 (1886)[3]. *Trichoptilus centetes* Meyr., Tr. Ent. Soc. Lond. 1886, 16—17[4]: 1887, 266[5]. *Pterophorus oxydactylus* Moore, Lp. Ceyl. III. 528—9, Pl. 209, 16 (1887)[6]. *Trichoptilus hawaiensis* Meyr., Tr. Ent. Soc. Lond. 1888, 239[7]. *Pterophorus oxydactylus* Swinh. and Cotes, Cat. Moths Ind. 669, No. 4549 (1889)[8]. *Trichoptilus centetes* Wlsm., Pr. Z. Soc. Lond. 1891, 494—5, 542 (1892)[9]. *Trichoptilus oxydactylus* Wlsm., Pr. Z. Soc. Lond. 1896, 277[10]. *Trichoptilus centetes* Wlsm., Pr. Z. Soc. Lond. 1897, 56, No. 1[11]: Ent. Mo. Mag. XXXIV. 192 (1898)[12].*

"Antennae ochreous-whitish, with a dark fuscous line on back. Palpi brownish-ochreous mixed with whitish, second joint reaching middle of face. Head and thorax ochreous. Forewings cleft from middle, segments linear; veins 2 and 10 present; brownish-ochreous, first segment more or less suffused with fuscous; an obscure dark fuscous dot in disc at one-third, and another on first segment at base; some white scales indicating very obscure bands on both segments before middle and towards apex; cilia ochreous-brown, on costa spotted with white on bands, on lower margin of first segment with two or three white scales on bands and a white subapical spot followed by a small black scale-tooth, on upper margin of second segment with a small white spot before apex, on lower margin of second segment with white bars opposite bands, interspaces greyer, and with a small black almost apical scale-tooth. [Exp. al.] 14—16 mm. Hindwings cleft firstly from one-fourth, secondly from base, segments linear; rather dark fuscous; cilia light ochreous-fuscous, third segment with a small well-defined black scale-tooth on inner margin at three-fifths, and a fringe of white hair-scales between this and base. Abdomen ochreous mixed with ochreous-whitish, apex in male with a single moderate obliquely ascending hair-pencil. Legs white, longitudinally striped with blackish, posterior tibiae banded in middle and at apex with dark ochreous-fuscous.

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* The small numerals refer to the localities given in the paragraphs on this subject at the end of the description.

♂♀ Six specimens. Closely allied to *T. centetes* and its group." Meyr., Tr. Ent. Soc. Lond. 1888, 239.

Types ♂♀ *oxydactylus* Wkr., Mus. Br.; *hawaiiensis* Btl., Mus. Br.; ♂ *centetes* Meyr., Mus. Meyr.

HAB. [? *UNITED STATES—ARIZONA*[9,12], ? *MEXICO*[9]] WEST INDIES—ST CROIX, IV—V.[11]; ST THOMAS, III.[11]; ST VINCENT[9,11]. ARABIA—Aden[10], Lahez[10]. INDIA—Poona[3,8], IX., XII.[3], Bombay[8]. CEYLON[1,6,8]. NEW GUINEA—Port Moresby, XI.[4]. QUEENSLAND[5].

HAWAIIA[7]. OAHU: Waianae, IV. 1892 (only on the plains, Perkins).—MOLOKAI, V. 1893 (sea-level, Perkins).—MAUI: Uoluolu (common on the sea-shore, Blackburn)[2]; Wailuku, 1894 (Perkins). Seven specimens.

3. PLATYPTILIA Hb.

PLATYPTILIA Hb., Verz. bek. Schm. 429 (1826)
= *AMBLYPTILIA* Hb., Verz. bek. Schm. 430 (1826)
= *PLATYPTILUS* Z., Is. 1841, 764; HS.; Wlgrn.
= § *CNAEMIDOPHORUS* Wlgrn., Vet. Ak. Hndl. III. (7) 10 (1859)
= *AMBLYPTILUS* Wlgrn., Vet. Ak. Hndl. III. (7) 13 (1859)
= *EUCNEMIDOPHORUS* Wlgrn., Ent. Tdsk. II. 96 (1881).

4. (1) *Platyptilia fuscicornis* Z. (Pl. X. fig. 4).

n. syn. = **cosmodactyla* Btl., Meyr. (nec Hb.).
Platyptilia fuscicornis Z., Hor. Soc. Ent. Ross. XIII. 460—2 (1877)[1]. *Amblyptilia cosmodactyla* (Hb.), var. Btl., Ann. and Mag. NH. (5. s.) VII. 407 (1881)[2]. *Platyptilia* **cosmodactyla* Meyr., Tr. Ent. Soc. Lond. 1888, 240[3].

"Antennis unicoloribus fuscis, fronte subconica; scutello atro, postice niveo-marginato; alis ant. cinereis, brunneo-conspersis, triangulo costali ante fissuram nigro, striga laciniarum albida, macula ante eam costali rufo-fusca; striola ciliorum digiti tertii nigra ante apicem. ♂.

Sehr ähnlich der ebenso grossen *Acanthodactyla*, aber ohne Schuppenzahn am Innenrande der Vorderflügel und mit blossem schwarzen Schuppenstreifen statt eines Zahnes in den Fransen der dritten Feder, ausserdem sogleich durch die einfarbig braunen, nicht hell geringelten Fühler zu erkennen.

Kopf hellbraungrau; Stirn ganz kurz kegelförmig. Taster um ¾ Kopflänge hervorstehend, länglich dreieckig, auswärts braun, am Ende des 2ten Gliedes bandförmig grau; Endglied kurz, grau. Fühler unbehaart, gegen das Ende mit verlängerten und deutlich abgesetzten Gliedern, einfarbig bräunlich, ausser am ersten Drittel der

Unterseite, das wie die Unterseite des Wurzelgliedes weisslich ist. Rücken braungrau; die Gegend des Schildchens ist bis zu den Schulterdecken tief schwarzbraun, hinten breit schneeweiss eingefasst. Hinterleib schmächtig, grau mit chokolatfarbenen Flecken; Bauch chokolatbraun, weisslich bestäubt und an den Seiten mit undeutlichen weissen Streifen; Analklappen ziemlich lang und schmal. Beine dünn. Die vordern an den Schenkeln braun mit weissen Fleckchen; Schienen auswärts ebenso, innen weiss und am Ende braun; Füsse weiss, an den Enden der zwei ersten Glieder braungrau, die Endglieder braun. An den Mittelbeinen: Schenkel weissgrau mit breitem, braunem Mittel- und Endband; Schienen weiss, am schwach verdickten Ende breit braun; Füsse weiss, an den 3 ersten Gliedern mit bräunlicher Spitze, das Endglied braun. Hinterbeine an Schenkeln und Schienen innen schmutzig weissgrau, die erstern auswärts braungrau, die letztern heller und hinter der Mitte, an der Wurzel der Mitteldornen und am Ende fleckartig braun; der Metatarsus bräunlich mit schmutzig weisslichem Basalviertel, die andern Glieder reinweiss, an den Enden braungrau. Alle Dornen sind klein, weiss, an Wurzel und Ende braun.

Vorderflügel 4½‴ lang, ziemlich schmal, hinten erweitert mit fein gespitzter, etwas verlängerter Flügelspitze, hell schiefergrau, längs des Innenrandes bräunlich gefleckt, so dass die Grundfarbe in dünnen Querlinien die Flecke trennt. Vor der Spalte liegt ein dreieckiger, schwarzer Costalfleck, dessen ausgezogene Spitze bis unter die Spalte reicht; vor ihm ist der Vorderrand als schmale Linie schwarz und durch graue Pünktchen unterbrochen; hinter ihm ist eine kurze, schneeweisse Costallinie, auf welche eine oben schwarze, unten gelblichrothe, fleckartige Stelle folgt, die unterwärts einen dicken schwarzen Längsstrich führt; sie wird durch die weissliche Querlinie begrenzt, welche ein schwarzes Costalfleckchen hinter sich hat und sich durch den etwas bräunlichen Hinterzipfel verlängert. Fransen weisslich; am reinsten sind die des Innenrandes vor dem Innenwinkel; diese tragen dem Costaldreieck gegenüber drei starke, tiefschwarze Schrägstriche. Die Hinterrandfransen sind an ihrer Wurzel mit einer tiefschwarzen, am Vorderzipfel einmal, am Hinterzipfel zweimal unterbrochnen Linie durchzogen. Am Ende der Spalte sind die Fransen schwarz.

Hinterflügel dunkelgrau. Die Fransen um die Spitze der Federn sind an ihrer Wurzel als Linie braun. Die Innenrandfransen der dritten Feder sind von der Basis aus mit einer Reihe schwarzer Schuppen bestreut; vor der Spitze der Feder sind sie weisslich mit einem schwarzen, etwas schrägen Schuppenstrich und an der Spitze der Feder mit einem solchen Fleckchen.

Unterseite der Vorderflügel dunkel braungrau, auf dem umgeschlagenen Costaltheil weissbestäubt, hinter dem Anfang der Spalte mit einem weissen, vorn und hinten schwarz begrenzten Costalfleckchen. Die Zipfel mit einigen weissen Stäubchen, der vordere mit vollständiger, weisser Querlinie. Fransen weisser als oben, aber eben so scharf schwarz gezeichnet.—Die erste und dritte Feder der Hinterflügel sind verdunkelt, die erste am meisten vor der Spitze, so dass sich keine weisse Querlinie ausbildet. Die

Schuppen der Innenrandfransen der dritten Feder sind reichlicher, und der schwarze Streifen etwas länger als oben.

Ein schön erhaltenes ♂ am 23 Februar bei Bogotá gefangen in Gesellschaft der *Platyd. pyrrhina*." [Z. Hor. Soc. Ent. Ross. xiii. 460—2 (1877).]

Type ♂ Mus. Wlsm.

Hab. colombia: Bogotá, ii[1]. hawaiia[3]. Kauai: Kaholuamano, 4000 ft., iv. 1895; Mts., 3000—4000 ft., v.—vi. 1894 (Perkins).—Oahu: Waianae Mts., 1600 ft. and upwards, *excl.* iv. 1892 (Perkins).—Molokai: 4000 ft., vi. 1893 (Perkins).—Lanai: 2000 ft., ii. 1894 (Perkins).—Maui: Wailuku, iv. 1894 (Perkins); Haleakala, 2000 ft. (Blackburn)[2].

Twenty-one specimens. Exp. al. 15—18 mm. "The larva was green or grey and hairy, the pupae were light or dark" (Perkins).

Bred at Oahu, but the food-plant was not identified.

5. (2) *Platyptilia brachymorpha* Meyr. (Pl. X. fig. 5).

Platyptilia brachymorpha Meyr., Tr. Ent. Soc. Lond. 1888, 240—1[1].

"Antennae fuscous. Palpi moderate (two), ochreous-brown, base and a median ring of second joint white, terminal joint mixed with white. Head and thorax light brown, thorax posteriorly ochreous-whitish. Forewings cleft from two-thirds, segments moderate, parallel-sided; light ochreous-brown, irrorated with white; costa rather dark fuscous, dotted with white; a rather large dark fuscous dot in disc before one-third, and another beneath costa before middle; a triangular dark fuscous blotch on costa about two-thirds, reaching half across wing, terminating in two transversely placed black dots before cleft, followed by an obscure whitish suffusion; a white line crossing both segments near hind margin, preceded in first segment by a large elongate black dot, in second by a small one, on costal margin of both segments by a dark fuscous suffusion, hind-marginal area beyond this fuscous; cilia of both segments on hind margin rather dark fuscous, slightly mixed with white, with a small scale-tooth at lower angle, on inner margin fuscous-whitish with a few scattered very small black scales. [Exp. al.] 14 mm. Hindwings cleft firstly from middle, secondly from before three-fourths; first segment moderately dilated, spatulate, second slightly dilated, its apex very long-pointed, its hind margin very oblique and concave; rather dark fuscous; cilia fuscous, third segment with a row of black scales on inner margin from base to middle, and one or two at four-fifths. (Abdomen broken.) Legs rather dark fuscous above, white beneath, tibiae not incrassated. ♂ (?). One specimen." Meyr. l. c.

Type Mus. Meyr.

Hab. hawaiia[1]. Oahu: Waialua, beach, iii. 1892.—Hawaii: Kona, above 4000 ft., 12, viii. 1892; Kaawaloa, above 2000 ft., ix. 1892 (Perkins). Six specimens.

6. (3) *Platyptilia rhynchophora* Meyr. (Pl. X. fig. 6).

=**repletalis* Btl. (nec Wkr.)[2].
*Platyptilia *repletalis* Btl., Ann. and Mag. NH. (5. s.) VII. 407 (1881)[1]. *Platyptilia rhynchophora* Meyr., Tr. Ent. Soc. Lond. 1888, 239—40[2].

"Antennae dark fuscous. Palpi very long (four), rather dark fuscous, sprinkled with whitish above. Head and thorax rather dark fuscous, finely sprinkled with ochreous-whitish; frontal cone short. Forewings cleft from two-thirds, segments moderate, parallel-sided; fuscous, towards middle of disc and on costal and dorsal edges irrorated with blackish; an obscure cloudy dark fuscous dot in disc at one-fourth, and a second below costa at one-third; a cloudy blackish dot immediately before cleft, indistinctly extended to costa, where it is followed by some whitish scales; an indistinct dark fuscous bar extending across middle of both segments parallel to hind margin, anteriorly suffused, posteriorly margined by an obscure whitish line; cilia fuscous, slightly mixed with whitish, on hind margin with an obscure darker fuscous line, on inner margin with a few scattered black scales. [Exp. al.] 17—18 mm. Hindwings cleft firstly from middle, secondly from three-fourths, first and second segments moderately dilated; rather dark fuscous; cilia fuscous; third segment with a row of black scales on inner margin from base to middle, and one or two at three-fourths. Abdomen fuscous. Legs fuscous, beneath whitish, banded with dark fuscous, tibiae not incrassated.

♂ ♀. Three specimens. Immediately recognisable by the unusually long palpi." Meyr., Tr. Ent. Soc. Lond. 1888, 239—40.

Type ♂ ♀ Mus. Meyr. (Paratype **repletalis* Btl., Mus. Br.).

HAB. HAWAIIA[2]. KAUAI: Kaholuamano, 4000 ft., IV. 1895 (Perkins).—OAHU: Waianae Mts., 3000 ft., IV. 1892 (Perkins).—MOLOKAI: about 3000—4000 ft., 5—13, VI. 1893 (Perkins).—MAUI: Haleakala, 5000 ft., III—IV. 1894, V. 1896; 6000 ft., III. 1894, V. 1896; 7000 ft., IV. 1894; 9000 ft., IV. 1894; crater X. 1896 (Perkins).—HAWAII: Mauna Loa, 4000 ft. (Blackburn)[1]. Twenty-three specimens.

7. (4) *Platyptilia insularis*, sp. nov. (Pl. X. fig. 7).

Antennae brownish fuscous, dusted with whitish cinereous. Palpi extending more than the length of the head beyond it; brownish fuscous, sprinkled with whitish cinereous. Head and Thorax brownish fuscous, profusely dusted with whitish cinereous. Forewings pale chestnut-brown, sprinkled with dark chestnut-brown and transversely mottled with whitish cinereous; the costa, narrowly shaded with dark chestnut-brown as far as the base of the fissure, is evenly speckled with whitish cinereous, a broad shade extending downward to the base of the fissure before which it forms a dark patch; a triangular dark chestnut-brown costal patch on the middle of the upper lobe extends nearly to the fissure, its outer edge very obliquely and narrowly margined with white, a similar but smaller patch occurring before the middle of the lower lobe but not reaching the dorsum, these patches are both preceded by thickly sprinkled whitish scales; cilia of the upper lobe whitish, with a dark line along their base; cilia of the lower lobe greyish brown, with a dark line along their base; a few dark spatulate scales lie in the cilia along the dorsum and there is some indication of a dark plical spot followed by another on the disc before the middle. Underside with a white costal spot above the base of the fissure succeeded by a slight sprinkling of whitish scales upon the upper lobe, the remainder of the wings being unsprinkled. Exp. al. 18—20 mm. Hindwings and cilia pale greyish brown, the dorsum of the posterior lobe thickly bestrewn with fuscous spatulate scales, not extending to its apex and forming no tooth-like projection. Underside sprinkled with a few white scales near the apex of the anterior lobe. Abdomen brownish fuscous, sprinkled with whitish cinereous, with a small whitish streak on either side near the base. Hind legs brownish fuscous, with diffused whitish bands round the terminal joints of the tarsi.

Type ♂ (26142) Mus. Wlsm.

HAB. OAHU: Waianae Mts., 3000 ft. IV. 1892.—MOLOKAI: above 3000 ft., 9—13, VI. 1893. Five specimens.

8. (5) *Platyptilia littoralis* Btl. (Pl. X. figs. 8—9).

Platyptilus littoralis Btl., Tr. Ent. Soc. Lond. 1882, 44—5[1]. *Platyptilia littoralis* Meyr., Tr. Ent. Soc. Lond. 1882, 241[2].

Antennae cinereous. Palpi projecting more than the length of the head beyond it; dark fawn-brown. Forewings fawn-brownish, with a slight tawny tinge, traversed transversely by numerous whitish cinereous strigulae, of which those near the base are somewhat diffused; a large trapezoidal brownish fuscous costal spot extending to the fissure is followed by a whitish costal spot (in some varieties this reaches almost to the whitish subterminal line, in other varieties the ground colour of the wing almost obliterates the dark trapezoidal and whitish costal spots, the latter becoming a small whitish or pale tawny spot); an oblique whitish cinereous line, parallel with the termen, crosses both lobes, preceded on the tornal lobe by a broad brownish fuscous spot contiguous to it, and on the apical lobe by a smaller spot of the same colour below the middle of the lobe; the space between this line and the termen is brownish fuscous, traversed by minute lines of whitish cinereous scales; the costa is narrowly darker-shaded throughout, especially before the apex; cilia pale cinereous, shaded to their middle with brownish fuscous, forming a somewhat abrupt median line; within the fissure the cilia are cinereous, with the exception of two opposite dark spots at its outer extremity, the dorsal cilia are also pale cinereous, studded with blackish scales. Exp. al. 22 mm. Hindwings and cilia tawny, the posterior lobe thickly studded with blackish scales on its dorsum, these not reaching to the apex. Abdomen dark fawn-brown, with a black spot surrounded by whitish on each side at the base. Legs dark fawn-brownish, with broad whitish bands around the middle of the spurs and on the three last tarsal joints; anterior tarsi whitish.

Type ♀ Mus. Br. (Caenotypes ♂ (25194); ♀ (25308) Mus. Wlsm.)

HAB. OAHU: nr. Honolulu (on shores of a small mountain lake. Blackburn)[1].—HAWAII: Kona, 3000 ft. IX. 1892; 4000 ft., 17—21, VII. 12, VIII. 1—8, IX. 1892 (Perkins). Six specimens.

This species is somewhat variable, the markings tending to be obliterated by suffusion of the ground-colour. In well-marked forms it is at once recognisable by the dark trapezoidal (instead of triangular) costal spot.

III. *ORNEODINA.*

4. ORNEODES Ltr.

ORNEODES Ltr. [Préc. Gen. Ins. 148 (1796) *MN*], Hist. Nat. Crust. Ins. III. 418 (1802): XIV. 258 (1805).
= *RIPHIDOPHORA* Hb., Tent. 2 (1806).
= *EUCHIRADIA* Hb., Verz. bek. Schm. 431 (1826).
= **ALUCITA* (L) Z. Is. 1841 (†865—7), ‡867—9: Lin. Ent. VI. 405 (1852) &c.

9. (1) *Orneodes angustestriata*, sp. nov. (Pl. X. fig. 10).

Antennae (broken). Palpi slightly recurved, terminal joint about as long as the median; ochreous, the median joint fuscous externally. Head and Thorax (denuded). Forewings dark brownish fuscous, the costal lobe with five transverse pale cinereous strigulae which are traceable throughout the other lobes, the outer three being bent outward on the costal edge of the third lobe; in the spaces before and behind the middle streak (which are wider than the other intervening spaces) the dark brown colour is slightly peppered with pale cinereous; cilia corresponding to the adjacent colour of the lobe. Exp. al. 11 mm. Hindwings with the pale strigulae more minute and more inclined to coalesce, leaving a moderately distinct dark band at two-thirds the wing-length, and a narrower one at one-third; cilia corresponding to the adjacent colour of the lobe. Abdomen (broken). Hind Legs whitish cinereous with four transverse fuscous tarsal bands above.

Type ♂ (26730) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., VI. 1894. One specimen.

10. (2) *Orneodes objurgatella*, sp. nov. (Pl. X. fig 11).

Antennae slightly serrate toward the apex; pale cinereous with an ochreous tinge. Palpi short, recurved to the level of the vertex; whitish cinereous, the median joint shaded with greyish fuscous externally, the terminal joint spotted with fuscous. Head and Thorax greyish cinereous. Forewings pale greyish fuscous, with narrow whitish cinereous streaks and speckling; on the costal lobe are four or five such pale transverse streaks, about equidistant from each other; the corresponding streaklets on the second lobe being a little beyond them; those on the third lobe corresponding with those on the second; those on the fourth, fifth, and sixth lobes receding towards the base; cilia corresponding to the colour of that portion of the lobe on which they rest. Exp. al. 9—11 mm. Headwings: no special pattern is traceable, the lobes being evenly speckled throughout with whitish cinereous and greyish brown, the cilia corresponding. Abdomen greyish cinereous. Legs cinereous, with whitish spots on the tarsal joints.

Type ♀ (25087) Mus. Wlsm.

Hab. Oahu: Mt. Kaala, Waianae Mts., 3000 ft., I. 1892; 2000 ft., IV. 1892 Two specimens.

This is a smaller form than the ordinary *hexadactyla* L., but not easy to distinguish from it by any intelligible form of description.

IV. *TINEINA.*

I. GELECHIADAE.

5. Aristotelia Hb.

Type *Tinea decurtella* Hb., (Hb. 1826).

ARISTOTELIA Hb., Verz. bek. Schm. 424 (1826); Wlsm., Ent. Mo. Mag. XXXI. 42 (1895); Meyr., HB. Br. Lp. 572 (1895); Wlsm., Pr. Z. Soc. Lond. 1897, 63.
=*CHRYSOESTHIA* Hb., Verz. bek. Schm. 422 (1826) *partim.*
=§*EVAGORA* Clem., Pr. Ac. Nat. Sc. Phil. XII. 165 (1860).
=§*NOMIA* Clem., Pr. Ac. Nat. Sc. Phil. XII. 167 (1860).
=*CHRYSOPORA* Clem., Pr. Ac. Nat. Sc. Phil. XII. 362 (1860).
=*NANNODIA* Hein., Schm. Deutsch. Tin. 281 (1870).
=§*ARGYRITIS* Hein., Schm. Deutsch. Tin. 283 (1870).
=§*APODIA* Hein., Schm. Deutsch, Tin. 286 (1870).
=*ERGATIS* Hein., Schm. Deutsch. Tin. 295 (1870).
=§*DORYPHORA* Hein., Schm. Deutch. Tin. 298 (1870).
=*XYSTOPHORA* Hein.—Wk., Schm. Deutsch. Tabelle Gattungen 6 (1876).
=*MONOCHROA* Hein., Schm. Deutsch. Tin. 308 (1870).
=§*LAMPROTES* Hein., Schm. Deutsch. Tin. 309 (1870).

11. (1) *Aristotelia maculaticornis*, sp. nov. (Pl. XIII. fig. 17).

Antennae white, narrowly but distinctly barred with brownish fuscous above. Palpi white, with two broad fuscous bands around the median joint, the terminal joint ringed with fuscous before the apex. Head white. Thorax white, sprinkled with fuscous.

Forewings white, with brownish fuscous markings, all more or less broken up by the white ground-colour; a basal patch, broader on the dorsum than on the costa, a triangular costal patch before the middle, reaching to the fold, and an inverted costal patch before the apex reaching to the end of the cell; this points towards a few fuscous scales on the dorsum and is preceded on the costa by a similar group, others occurring about the apex and termen; cilia white, with a few fuscous scales about the apex. Exp. al. 20 mm. Hindwings, as broad as the forewings, bisinuate below the apex; pale cinereous; cilia white, with a slight ochreous tinge. Abdomen brownish fuscous. Legs whitish.

Type ♀ (28741) Mus. Wlsm.

Hab. Hawaii: Mt. Kilauea, viii. 1896. Unique.

12. (2) *Aristotelia nigriciliella*, sp. nov. (Pl. XIII. fig. 18).

Antennae whitish ochreous, barred with blackish above. Palpi whitish ochreous, shaded with fuscous externally nearly to the apex of the median joint. Head and Thorax brownish cinereous, the tegulae mottled with brownish fuscous. Forewings brownish cinereous, with diffused shading of scattered brown and brownish fuscous scales, especially along the costa beyond the basal third, along the dorsum from the base to the tornus, and across the apical area; at one-third from the base an outwardly oblique chestnut-brown fascia runs from the costa to the fold, but scarcely reaches the dorsum (in some specimens this appears to be absent); cilia whitish ochreous. Exp. al. 17—22 mm. Hindwings shining, pale leaden grey; cilia pale greyish ochreous. Abdomen brownish cinereous. Legs whitish ochreous, with indistinct broad brownish-grey shade bands.

Type ♂ (28115); ♀ (27390) Mus. Wlsm.

Hab. Hawaii: Mt. Kilauea, (1) vii. 1895; (3) viii. 1896; Olaa, 2000 ft., (1) xi. 1896. Five specimens.

The ♀ is larger and paler than the ♂, with the palpi more distinctly marked with dark shading on both joints. In the forewings there is no actual fascia, but somewhat more confluent mottling indicates its position; similar mottling occurs at the base of the dorsum and on the outer third. The specimen from Olaa (28658) is doubtfully referred to this species.

13. (3) *Aristotelia ichthyochroa*, sp. nov. (Pl. XIII. fig. 19).

Antennae shining, whitish cinereous. Palpi smooth, the terminal joint nearly as long as the median; whitish on their inner sides and above, fuscous externally. Head [denuded—apparently whitish cinereous]. Thorax fuscous, the tegulae tipped with whitish cinereous. Forewings rather shining, whitish cinereous, but showing a slight ferruginous reflection in certain lights; a broad triangular ferruginous costal blotch, commencing at one-fourth, descends outward to the middle of the fold and is thence diffused upward to the commencement of the costal cilia, a few dark ferruginous scales about the apex and termen precede the leaden grey cilia which have also in some lights a reddish brown reflection; underside fuscous. Exp. al. 16 mm. Hindwings as broad as the forewings, the termen obliquely bisinuate below the obtuse apex; dark brownish grey; cilia brownish grey; underside dark leaden grey. Abdomen ferruginous at the base, fuscous beyond. Legs with the hind tibiae hairy; pale cinereous, shaded with greyish fuscous externally.

Type ♂ (26398) Mus. Wlsm.

Hab. Molokai: Woods above Pelekunu, 27. viii. 1893. Unique.

14. (4) *Aristotelia epermeniella*, sp. nov. (Pl. XIII. fig. 20).

Antennae fuscous, with pale annulations. Palpi fuscous, with the end of the median joint and the base and apex of the terminal joint pale fawn-ochreous. Head greyish ochreous. Thorax pale greyish fuscous. Forewings pale fawn-ochreous, sprinkled and shaded with rust-brown and fuscous, the latter predominating in three sprinkled dorsal patches below the fold and slightly indicated along the middle of the costa; the former prevailing, in a short basal patch above the fold, in a strong outwardly oblique shade from the costa at one-fourth, reaching to the fold on the outer edge of an ill-defined oblique fascia of the paler ground-colour and thence in mottled sprinkling over the remaining wing-surface to the apex; cilia very pale fawn-ochreous, slightly mottled along their base with fuscous. Exp. al. 16 mm. Hindwings bisinuate below the apex; greyish; cilia pale fawn-ochreous. Abdomen greyish ochreous. Legs pale fawn-ochreous.

Type ♀ (27671) Mus. Wlsm.

Hab. Kauai: Kaholuamano, 4000 ft., iv. 1895. Unique.

15. (5) *Aristotelia notata*, sp. nov. (Pl. XIII. fig. 21).

Antennae whitish ochreous. Palpi whitish ochreous, the median joint sprinkled externally with blackish scales nearly to its apex. Head and Thorax whitish ochreous. Forewings whitish ochreous; a small blackish spot at the extreme base of the costa, a larger diffused spot on the fold near its base, a triangular costal patch before the middle, its apex reaching to the fold, a patch at the end of the cell and a smaller one on the costa before the apex with a series of almost connected blackish spots in the whitish ochreous terminal and costal cilia. Exp. al. 14 mm. Hindwings trapezoidal, shining, pale rosy grey; cilia greyish, with a slight ochreous tinge. Abdomen brownish grey. Legs whitish ochreous.

Type ♀ (26218) Mus. Wlsm.

Hab. Molokai: above 3000 ft., 5. vi. 1893; 4500 ft., 17. ix. 1893. Two specimens.

16. (6) *Aristotelia lanaiensis*, sp. nov. (Pl. XIII. fig. 22).

Antennae pale cinereous, faintly banded with fuscous above. Palpi with the median joint fuscous, the shorter terminal joint pale cinereous, with three small fuscous dots externally. Head and face ash-grey. Thorax whitish cinereous. Forewings ashy whitish, sparsely sprinkled with pale brownish fuscous, a small dark fuscous spot at the base of the costa is succeeded by a triangular fuscous costal patch, scarcely before the middle, and a few fuscous scales about the commencement of the costal cilia; cilia pale brownish cinereous. Exp. al. 11 mm. Hindwings bisinuate below the apex; ashy grey; cilia pale brownish grey. Abdomen greyish. Legs pale whitish ochreous.

Type ♂ (26514) Mus. Wlsm.

HAB. LANAI: 2000 ft., VII. 1894. Unique.

17. (7) *Aristotelia elegantior*, sp. nov. (Pl. XIII. fig. 23).

Antennae cinereous, barred above with fuscous. Palpi cinereous, the median joint fuscous nearly to its apex, the terminal joint tipped with fuscous and shaded beneath with the same before the apex. Head and Thorax greyish cinereous. Forewings cinereous, slightly suffused with grey along the dorsum and toward the apex; a large brown costal blotch before the middle, terminating in a bright ferruginous patch on the fold; this is followed by two spots, one before, the other at the end of the cell, brown on their upper half, bright ferruginous beneath; some pale cinereous mottling extends around the apex on the costa and termen; cilia brownish ochreous. Exp. al. 13 mm. Hindwings greyish; cilia brownish grey, with a slight ochreous tinge. Abdomen dull brownish grey. Legs brownish cinereous, with fuscous shades along the spurs and at the joints of the tarsi externally.

Type ♂ (25700) Mus. Wlsm.

HAB. OAHU: Near head of Kawailoa Gulch, IV. 1893. Unique.

This species is very distinct, otherwise it would not have been worth describing from a mutilated specimen.

18. (8) *Aristotelia mendax*, sp. nov. (Pl. XIII. fig. 24).

Antennae fawn-ochreous, narrowly banded above with fuscous. Palpi fawn-ochreous, each joint annulate before the apex and clouded beneath with fuscous, the extreme apex fuscous. Head and Thorax fawn-ochreous. Forewings pale fawn-ochreous, profusely sprinkled and minutely mottled with fawn-brown, almost obliterating the paler ground-colour, a few blackish specks along the costa, especially before the middle; cilia fawn-ochreous mottled with fawn-brown along their base. Exp. al. 10—12 mm. Hindwings bisinuate below the apex; pale grey; cilia brownish cinereous. Abdomen greyish, anal tuft fawn-ochreous. Legs whitish ochreous, the spurs fuscous externally.

Type ♂ (27586) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (2) IV. 1895; Halemanu, 4000 ft., (1) V. 1895; Mts., 3000—4000 ft., (1) VI. 1894. Four specimens.

19. (9) *Aristotelia arcuata*, sp. nov. (Pl. XIII. fig. 25).

Antennae whitish ochreous, clouded and spotted with fuscous toward the apex. Palpi whitish ochreous, the median joint dark fuscous, except at its base and apex, the terminal joint tipped with fuscous. Head and Thorax whitish ochreous. Forewings with the costa much arched, apex acute, termen very oblique; whitish ochreous, gradually suffused from one-third with dull olive-brown, leaving a tornal, and a smaller opposite costal patch of the pale ground-colour; a minute dark spot is visible in the fold a little beyond its middle; cilia very pale ochreous. Exp. al. 12 mm. Hindwings and cilia brownish grey. Abdomen greyish fuscous. Legs pale brownish ochreous.

Type ♂ (25066) Mus. Wlsm.

HAB. OAHU: Waianae Mts, 3000 ft., IV. 1892. Unique.

6. MERIMNETRIA, gen. nov.

(μεριμνήτρια = one who is over careful about).

Type *Merimnetria flaviterminella* Wlsm.

Antennae (1), widening beyond the base, the stem wide, slightly flattened; serrate towards the apex. Maxillary Palpi absent. Labial Palpi recurved to above the vertex; smooth; terminal joint not longer than the median. Haustellum present. Ocelli absent. Head and Thorax smooth. Forewings five times as long as broad, the margins parallel until tapering off to the lanceolate apex: neuration, 11 veins (7 and 8 coincident to costa); 2 and 3 separate. Hindwings as broad as the forewings; termen sinuate below the apex; cilia longer than the width of the wing: neuration, 8 veins; 3 and 4 connate, 6 and 7 remote, but somewhat approximating towards base. Abdomen flattened. Legs, hind tibiae somewhat hairy above.

This genus should be placed in the neighbourhood of *Strobisia* Clms. and *Drepanoterma* Wlsm. It may be separated from both by its antennae, which are not ciliate as in the latter, and they are longer and stouter than in the former; both these genera differ also in having veins 2 and 3 of the forewings stalked. The uncate termen of the forewings in *Drepanoterma* and the stalking of veins 6 and 7 of the hindwings in *Strobisia* are other points of distinction.

20. (1) *Merimnetria flaviterminella*, sp. nov. (Pl. XIII. fig. 26).

Antennae and Palpi fuscous. Head and Thorax fuscous, the latter with some chocolate-brown scales. Forewings chocolate-brown, with fuscous suffusion, especially at the base and along the costa and fold; a few steel-grey scales scattered about the end of the cell and beyond it, also about the middle of the fold; costal and tornal cilia greyish fuscous, terminal cilia pale ochreous. Exp. al. 11 mm. Hindwings bisinuate below the apex; brownish fuscous, cilia tawny greyish fuscous. Abdomen fuscous. Legs greyish.

Type ♂ (28611) Mus. Wlsm.

Hab. Hawaii: Hilo, 2000 ft., i. 1896. Unique.

7. Phthorimaea Meyr.

Type *Gelechia* (? *Bryotropha*) *operculella* Z. (Meyr. 1902).

PHTHORIMAEA Meyr., Ent. Mo. Mag. xxxviii. 103—4 (1902).

21. (1) *Phthorimaea operculella* Z. (Pl. XIII. fig. 27).

=*solanella* Bdv.[44]; =§*terrella* Wkr.[25]; =*tabacella* Rag.[21]; =**piscipellis* Howard (nec Z)[43]. *n. syn.*=*sedata* Btl.

[On the Potato Grub of Tasmania. Berthon, *Papers and Pr. Roy. Soc. Van Diemen's Land* iii. 76—89 (1855)[1].] *Gelechia terrella* Wkr., Cat. Lp. B.M. xxx. 1024 (1864)[2]. *Gelechia* (? *Bryotropha*) *operculella* Z., Verh. Z.B. Ges. Wien, xxiii. (1873) Abh. 262—3, Pl. III. 17 (1873)[3]. *Bryotropha solanella* J.B., Soc. Centr. Hort. (xi. 1874)[4]; Rag., Bull. Soc. Ent. Fr. xliv. (5. s. v. 1875) xxxv.—vii. (1875)[5]: *Bull. Soc. d'Acclimat.* (3. s.) ii. 223—9 (1875)[6]; Bdv., *Bull. Soc. d'Acclimat.* (3. s.) ii. 272—3 (1875)[6]; Rivière, J.B., *Soc. Centr. Hort.* 1876, 473—84[7]: (=sep. 1—12) (1876)[8];......*Deutsch. landw. Presse* iii. 606 (1876)[9];......*Rev. Sc. Nat. Montpellier*......(ix. 1876)[10]. *Gelechia operculella* Chamb., Bull. U.S. G.G. Surv. iv. 145 (1878)[11]. *Lita solanella* Meyr., Pr. Lin. Soc. N.S.W. iv. 112—14 (vi. 1879)[12]: Ent. Mo. Mag. xvi. 66 (viii. 1879)[13]. *Gelechia* (*Lita*) *solanella* Rag., Bull. Soc. Ent. Fr. xlviii. (5. s. ix. 1879) cxlvi.—vii. (1880)[14]. *Gelechia tabacella* Rag., Bull. Soc. Ent. Fr. xlviii. (5. s. ix. 1879) cxlvi.—vii. (1880)[15]. *Gelechia* (*Bryotropha*) *solanella*, *Jr. d'Agr. pratique* xliv. T. 1, 339—42, fig. (1880)[16]. *Gelechia sedata* Btl., Cist. Ent. ii. 560, No. 88 (1880)[17]. *Parasia sedata* Btl., Ann. and Mag. N.H. (5. s.) vii. 399, No. 86 (1881)[18]. *Lita solanella* Tepper, *Tr. and Pr. Roy. Soc. S. Austral.* iv. 57—60, 154 (1882)[19]. *Parasia sedata* Meyr., Ent. Mo. Mag. xx. 35 (1883)[20]. *Lita solanella* (=*tabacella* Rag.) Oliv., Bull. Soc. Ent. Fr. liv. (6. s. v. 1885) cxi.—xii. (x. 1885)[21]. *Lita tabacella* Rag., Bull. Soc. Ent. Fr. liv. (6. s. v. 1885) cxi.—xii. (x. 1885)[22]. *Lita solanella* Rag., Bull. Soc. Ent. Fr. liv. (6. s. v. 1885) cxi.—xii. (x. 1885)[23]. *Gelechia solanella* Meyr., N.Z. Jr. Sc. ii. 590 (xi. 1885)[24]: Tr. N.Z. Inst. xviii. 166—7, No. 6 (1886)[25]. *Lita solanella* Meyr., Tr. Roy. Soc. S. Austral. viii. 13 (1886)[26]; Tryon, *Rp. Ins. and Fungus Pests Queensld.*

I. 175—81 (1889)[27]. *Litha solanella* Alph., Mem. Lp. Rmff. V. 231, No. 56 (1889)[28]. [“*Small Tineid*” Koebele, U.S. Dp. Agr. Div. Ent. Bull. XXI. 25 (1890)[29]. *Lita solanella* Olliff, Agr. Gaz. N.S.W. II. 158—9 (1891)[30]; [Riley and Howard], U.S. Dp. Agr. Div. Ent. Ins. Life IV. 239—42, fig. 27 *a—l* (IV. 1892)[31]; Rbl., Ann. K.K. Hofmus. VII. 274—5, 282, No. 57 (1892)[32]; Olliff, Agr. Gaz. N.S.W. III. 701—3, figs. *a—l* (IX. 1892)[33]: 828—9 (X. 1892)[34]; Wight, U.S. Dp. Agr. Div. Ent. Ins. Life V. 163—4 (I. 1893)[35]; Riley, *Ann. Rp. U.S. Dp. Agr.* 1892......(1893)[36]; Riley and Howard, U.S. Dp. Agr. Div. Ent. Ins. Life VI. 275—6 (II. 1894)[37]; Rbl., Ann. K.K. Hofmus. IX. 18, 89, No. 171 (1894)[38]: XI. 127, Nos. 191, 146, 190 (1896)[39]. *Gelechia *piscipellis* [Howard], U.S. Dp. Agr. Div. Ent. Bull. VII. (n. s.) 76 (1897)[40]; McCarthy, *N. Car. Agr. Exp. Stn. Bull.* CXLI. 133—5, fig. (1898)[41]; Quaintance, *Florida Agr. Exp. Stn. Bull.* XLVI.......(1898)[42]. *Gelechia solanella* Howard, Yearbook U.S. Dp. Agr. 1898, 137—40, figs. 20—21 (1899)[43]: U.S. Dp. Agr. Farm. Bull. CXX. 19—22, figs. 14—15 (1900)[44]; Busck, U.S. Dp. Agr. Div. Ent. Bull. XXII. (n. s.) 89 (1900)[45]. *Gelechia* (*Lita*) *solanella* Stgr. and Rbl., Cat. Lp. Pal. II. 146, No. 2636 (1901)[46]. *Phthorimaea operculella* Meyr., Ent. Mo. Mag. XXXVIII. 103—4 (1902)[47].

[N.B. *References printed in italics have not been verified.*]

Types ♂♀ *terrella* Wkr., ♂ Mus. Br.; *operculella* Z., ♂♀ Mus. Wlsm.; *solanella* Bdr., Mus. Bdr.[5]; *tabacella* Rag., Mus. Paris; *sedata* Btl., ♂ Mus. Br.

Antennae brownish cinereous. Palpi cinereous, with two umber-brown patches on the median joint externally, a spot of the same on the base of the terminal joint and a broad band before its apex. Head brownish cinereous; face pale cinereous. Thorax brownish cinereous, with three smoky brown longitudinal lines above. Forewings dull buff-brown, shaded and spotted with dark smoky brown; this forms a dorsal shade below the fold, a terminal shade reverting around the apex, and a spot at the end of the cell from which narrow lines radiate outward along the veins; there are also two spots near the base of the costa, the first succeeded by another below and beyond it, the second followed by one on the cell and one on the fold in an oblique line, a pair of smaller spots lying beyond this line on the cell, also in oblique succession; cilia pale buff-brownish, sprinkled along their base with smoky brown. Exp. al. 15—16 mm. Hindwings pale grey; cilia pale brownish ochreous. Abdomen and legs brownish cinereous.

Caenotype ♂ (25812) Mus. Wlsm.

HAB. **EUROPE**: SPAIN[23, 32, 38, 46]; *CATALONIA*[23, 32, 38, 46]; Barcelona[23, 32]. **AFRICA**: ALGERIA[4–5, 12–16, 21–3, 25, 31–3, 38, 43–4, 46–7]; El-Bear[4–5], Hussein Dey[15], Jemmapes[23], Mondovi[21, 23]. **CANARIES**[28, 32, 38–9, 46]: TENERIFE[28, 32, 38–9]; Orotava[28, 32]; FUERTEVENTURA[32, 38–9]; Rio Palma. **WEST INDIES**[45]: PORTORICO[45]. **UNITED STATES**[3, 11, 29, 31, 33, 35, 37, 39–44, 46–7]: VIRGINIA[43–4]; Pittsylvania Co.[43–4]; N. CAROLINA[40–1, 43–4]; S. CAROLINA[43–4], Sandy Run (Lexington Co.)[43–4]; FLORIDA[42–4]; TEXAS[3, 37], Fredricksburg[37]; CALIFORNIA[29, 31, 33, 35, 37, 39], Bakersfield (Kern Co.)[31], San Francisco[37]. **HAWAIIA.** KAUAI: Mts., 3000—4000 ft., v—vi. 1894 (Perkins).—MOLOKAI: sea-level, v. 1893; 3000 ft., and upwards 6—16 ix. 1893 (Perkins).—HAWAII: Kawaiahae, sea-shore (Blackburn)[18]; Kona, 3000 ft., vi. 1892, 5000 ft., 4. vii. 1892, 4000 ft., 21. vii—11. ix. 1892 (Perkins). Thirty-six specimens. **AUSTRALIA**[1–2, 12, 19, 26–7, 30–1, 33, 39, 43–4, 46–7]: QUEENSLAND[2, 27, 31]; Moreton Bay[2], Toowoomba[27, 31]; N. S. WALES[12, 30, 33]; Canley Vale[30], Cullinga[30], Hunter River[12], Shoalhaven[12], Sydney[12], Tamworth[33]; VICTORIA[12]; Melbourne[12]; TASMANIA[1, 31, 33, 39]; S. AUSTRALIA[19, 26, 31]; Adelaide[19, 26, 31]. **NEW ZEALAND**[17, 24–5, 29–31, 33, 35, 39, 43–4, 47]; Taranaki[24–5], Napier[24–5].

LARVA. *Lycopersicum esculentum* (tomato) mining leaves[42–4]. *Nicotiana tabacum* (tobacco) mining leaves[15, 21–2, 30, 32, 34, 40]; in stems[33–4]. *Solanum carolinense* (horse nettle) mining leaves[41, 43–4]. *Solanum melongena* (egg plant) mining leaves and boring in fruit[42–4]. *Solanum tuberosum* (potato) in shoots and mining down stem into tubers[4–5, 33–4]; in tubers[12, 14, 21, 23–5, 31–5, 43–4]; mining leaves[31, 34].

Typha angustifolia in heads[23] [most improbable that these were larvae of *Phthorimaea operculella* Z, they probably = *Scieropepla typhicola* Meyr., and possibly also *Limnaecia phragmitella*, Stn.] ii[12, 33], v[21–3, 43–4], vi—ix[43–4], x—xi[31, 43–4].

IMAGO. i—iii[25], iv[25, 32], v[21, 33], vi—vii (Perkins), viii[3], ix—x[32], x[25, 31, 33], xii[25, 31].

The oldest known name for this species is *Gelechia terrella* Wkr. (1864), but this is homonymous with *Gelechia terrella* (Schiff.) Wkr. Cat. Lp. Ins. BM. xxix. 573, No. 57 (1864).

8. STOEBERHINUS Btl.

Type *Stoeberhinus testaceus* Btl. (Btl. 1881).

STOEBERHINUS Btl., Ann. and Mag. NH. (5 s.) vii. 402, 401, fig. 2 (1881), Wlsm., Tr. Ent. Soc. Lond. 1887, 140, 171—2.

Antennae ($\frac{2}{3}$) simple. Maxillary Palpi short, dependent. Labial Palpi: ♂ long, strongly recurved over the thorax; the basal joint reaching nearly to the top of the head, smooth, or with a few projecting scales above at its apex; the median joint three times the length of the basal, strongly bent over, smooth; the terminal joint shorter than the median, with a strong brush of long hair-scales on its inner edge: ♀ smooth, recurved to above the vertex, the median and terminal joints of about equal length, the latter tapering, acute, more slender than the former; the basal joint not abnormally developed. Haustellum long, scaled. Head with appressed scales. Thorax smooth. Forewings (in form similar to those of *Depressaria* Hw.), apex obtuse, termen slightly oblique, not sinuate: neuration 11 veins (7 and 8 coincident, to costa); 2 and 3 stalked. Hindwings as broad as the forewings, termen slightly sinuate: neuration 8 veins; 6 and 7 stalked, connate, or approximate; 3 and 4 connate, or short stalked; 5 moderately straight. Abdomen somewhat flattened. Legs, hind tibiae smooth.

Closely allied to *Autosticha*, Meyr. (=§ *Automola*, Meyr.), from which it differs in the extraordinary palpi of the ♂. Butler described the palpi of the ♀ as porrect; this is incorrect, they are recurved.

22. (1) *Stoeberhinus testaceus* Btl. (Pl. XIII. fig. 28).

Stoeberhinus testaceus Btl., Ann. and Mag. NH. (5 s.) VII. 401 fig. 2, 402—3 no. 73 (1881)[1]; Wlsm., Tr. Ent. Soc. Lond. 1887, 171—2[2].

Antennae cinereous, or pale ochreous, showing faint annulations in the darker forms; basal joint brownish cinereous. Palpi: ♀ pale cinereous, sprinkled with brownish scales, a pale ring around the apex of the median joint: ♂ with the terminal brush dark brown. Head and thorax brownish cinereous. Forewings pale brownish cinereous, varying to pale ochreous, profusely sprinkled with dark brownish scales, a small dark brownish spot at the extreme base of the costa and a similar opposite spot close to the base of the dorsum; in the fold before its middle is an elongate chestnut-brown spot, another on the disc a little above and beyond it, a third in the same oblique line about the middle of the costa, and a fourth at the end of the cell; a slight chestnut-brown shade along the termen preceding the pale brownish cinereous cilia. Exp. al. 14—16 mm. Hindwings and cilia pale brownish grey, a slender line along the base of the latter inclining to ochreous. Abdomen pale brownish cinereous. Legs somewhat paler.

Type ♂ (73: 81—7) ♀ Mus. Br.; Caenotype ♀ (26242); ♂ (25030) Mus. Wlsm.

HAB. HAWAIIA. KAUAI: Makaweli, sea-level, VI. 1894 (Perkins).—OAHU: Honolulu (Blackburn)[1-2], 29. VIII. 1882 (Meyrick); Waianae Mts., 1500 ft., IV. 1892, "on tree-trunks and rocks common, also I think on the plains and even in Honolulu" (Perkins), 3000 ft., IV. 1892, "beaten from dead wood" (Perkins).—MOLOKAI: sea-level, V. 1893.—HAWAII: Kona, 1500 ft., IX. 1892, "at light" (Perkins), Kaawaloa (Kona), 1500 ft., IX. 1892 (Perkins); Olaa, 2000 ft., XI. 1896 (Perkins). Twenty-eight specimens. E. PACIFIC. MARQUESAS IS.: Faton-Hiva Id. (1) 10—11, III. 1883, "beaten out of Pandanus thatch" (J. J. Walker); Taou-ata, Id. (3) 12. III. 1883 (J. J. Walker). Four specimens.

The series varies much in the extent of the brown scaling on the forewings, which in some cases becomes almost a complete suffusion of the wing-surface through which the spots are less distinctly visible, while in others it is almost confined to the region of the fold leaving the spots plainly apparent.

9. AUTOSTICHA, Meyr.

Type ♂ *Automola pelodes* Meyr. (Meyr. 1886).

§ *AUTOMOLA*, Meyr., Ent. Mo. Mag. XX. 34 (1883) = AUTOSTICHA, Meyr. Tr. Ent. Soc. Lond. 1886, 281.

"Antennae rather stout, slightly serrate, simple, basal joint moderate, simple. Maxillary palpi rudimentary, short, drooping. Labial palpi moderately long, recurved; second joint broadly thickened with dense appressed scales; terminal joint somewhat shorter than second, rather stout acute. Tongue long. Head smooth. Thorax smooth. Forewings elongate; with eleven veins, 2 and 3 stalked from just before angle of cell, 7 to costa. Hindwings trapezoidal, as broad as the forewings, hind margin markedly sinuate beneath apex, cilia moderate ($\frac{2}{3}$); with eight veins, 3 and 4 stalked from angle of cell, 6 and 7 stalked. Abdomen moderate, distinctly margined. Legs: posterior tibiae with dense appressed hairs.

Doubtless allied to the two preceding genera" [*Thyrocopa*, Meyr. and *Synomotis*, Meyr.]: "but differing from them and almost the whole family in the possession of only eleven veins in the forewings, this exceptional structure is evidently due to the coalescence of the normal veins 7 and 8, which coincide for their whole length, instead of for a portion only." Meyr.[1]

23. (1) *Autosticha pelodes* Meyr. (Pl. XIV. fig. 1).

Depressaria **convictella* Btl., Ent. Mo. Mag. XIV. 50, no. 39 (1877)[1]. *Automola pelodes* Meyr., Ent. Mo. Mag. XX. 34—5 (1883)[2]. *Autosticha* [*pelodes*] Meyr., Tr. Ent. Soc. Lond. 1886, 281[3].

"Head, palpi, antennae, thorax, abdomen, and legs whitish ochreous, thinly sprinkled with fuscous; second joint of palpi externally densely irrorated with dark fuscous, terminal joint with a slender blackish median ring. Forewings moderately elongate, costa moderately arched, apex obtuse, hind-margin obliquely rounded; whitish ochreous, somewhat suffused with ochreous, and thinly sprinkled with dark fuscous; a blackish dot at base of costa; a small blackish dot in disc before middle, a second rather obliquely beyond it on fold, and a third more conspicuous in disc beyond middle; a row of blackish dots between veins on hind margin and apical fourth of costa; cilia whitish ochreous sprinkled with fuscous. Exp. al. 15 mm. Hindwings whitish ochreous slightly greyish tinged; cilia whitish ochreous." Meyr.[1]

Type ♂ Mus. Meyr.

HAB. HAWAIIA[2]. OAHU: Honolulu[1].

This species was not met with by Mr Perkins.

"This is the species considered by Mr Butler to be synonymous with the Australian *convictella* Walk. It would be alike unexpected and interesting to find any species native to both Australia and the Hawaiian Islands; but as a matter of fact, *convictella*, Walk., belongs to the genus *Eulechria* in the *Oecophoridae*, and differs from the above in almost every point of structure; nor is there even any close superficial resemblance." Meyr.[1]

10. Hodegia, gn. n.

(ὁδηγία = guidance).

Type ♀ *Hodegia apatela* Wlsm.

Antennae (♀) as long as the forewings, simple. Maxillary Palpi short, meeting at the base of the haustellum. Labial Palpi recurved, 5 times the length of the head; terminal joint acute, almost as long as the median, median joint with appressed scales. Haustellum long, scaled at the base. Ocelli absent. Head (denuded). Thorax smooth. Forewings bulging at the base, acutely lanceolate, termen and dorsum obliquely receding to flexus, tornus obsolete: neuration 11 veins (4 absent, probably coincident with 3); 7 and 8 stalked for the greater part of their length, 7 to costa immediately above apex; 5 approximating to 3+4; veins 2—10 closely packed in the contracted apical portion of the wing; fork of vein 1 very long (almost ½). Hindwings triangular, acute: neuration 8 veins; 3 and 4 stalked, 6 and 7 stalked; 5 straight, slightly approximated to 3+4; 2—7 closely packed in the contracted apical portion of the wing; 8 connected with cell by cross-vein. Abdomen robust, almost as long as the forewings, ovipositor extruded. Legs: hind tibiae with appressed scales, but slightly rough-haired above; spurs well developed.

Though resembling *Chimabacche* Hb. in appearance this genus belongs to the *Gelechiadae* and to the same group as *Thyrocopa*, Meyr. It is to be regretted that we are unacquainted with the ♂.

24. (1) *Hodegia apatela*, sp. nov. (Pl. XIV. fig. 2).

Antennae greyish fuscous, dusted with white scales. Palpi hoary white, dusted with brownish scales. Head hoary greyish. Thorax greyish fuscous, the tegulae tipped with stone-whitish. Forewings brownish cinereous, sprinkled with whitish scales, especially about the costa and apex; a streak of black scaling commencing upon the middle of the disc runs nearly to the apex, a similar streak commencing at the base extends along the fold to its outer end, a patch of blackish scales beneath the base of the costa and another at the flexus. Exp. al. 23 mm. Hindwings pale cinereous. Abdomen brownish grey. Legs brownish grey, sprinkled with pale cinereous.

Type ♀ (28447) Mus. Wlsm.

Hab. Maui: Haleakala, 9500 ft., v. 1896. Unique.

The single female has much the appearance of *Chimabacche fagella*, Schiff., but differs in neuration. It is in poor condition, but is certainly distinct from any known species.

Perkins, Ent. Mo. Mag. xxxii. 195 (1896) mentions this specimen thus: "A large Tineid with reduced wings and incapable of flight is shaken from a grass tuft above 9000 feet" [on Haleakala].

11. PTYCHOTHRIX, gen. nov.

(πτύξ=a fold; θρίξ=a hair).

Type *Ptychothrix vagans* Wlsm.

Antennae bipectinate (3), the pectinations diminishing in length outwardly, each pectination biciliate. Labial Palpi smooth, recurved to above the vertex, terminal joint shorter than the median. Maxillary Palpi short. Haustellum moderate. Head and Thorax smooth. Forewings suborate, lanceolate, apex depressed, termen very oblique: neuration 12 veins; 7 and 8 stalked, 7 to costa. Hindwings broader than the forewings, apex slightly depressed, termen slightly sinuate near the apex; ♂ with a tuft of hairs, in a depressed fold, from the base of the costa: neuration 8 veins; 3 and 4 shortly stalked, 5 bent over towards origin of 3+4, 6 and 7 stalked. Abdomen somewhat slender; anal appendages elongate, conspicuous. Legs rather coarsely scaled, but smooth.

Allied to *Thyrocopa* Meyr., and *Cryptophaga* M'Leay, differing from the former in the bipectinate antennae and from the latter by possessing a costal tuft on the hindwings of the ♂.

25. (1) *Ptychothrix vagans*, sp. nov. (Pl. XIV. fig. 3).

Antennae cinereous, inclining to ochreous. Palpi dark brown nearly to the apex of the median joint, thence fawn-ochreous. Head and thorax cinereous, with a brownish grey gloss. Forewings rather shining, pale cinereous, shaded with dark brown at the base, which is diffused outwards along the dorsum and shortly along the costa, also lightly sprinkled across the apical portion of the wing; there is a faint indication of three spots, one about the middle of the disc, one at the end of the cell, and one on the fold nearer to the former than to the latter; cilia pale cinereous. Exp. al. 22 mm. Hindwings pale brownish cinereous, the cilia slightly paler. Abdomen pale cinereous, transversely banded above at the joints with dark brown. Legs pale fawn-ochreous.

Type ♂ (27522) Mus. Wlsm.

HAB. KAUAI: Halemanu, 4000 ft., v. 1895. Unique.

12. PSYCHRA, gen. nov.

(ψυχρά=unedifying).

Type *Psychra phycidiformis* Wlsm.

Antennae ($\frac{2}{3}$), serrate toward the apex, biciliate ($\frac{2}{3}$) throughout. Maxillary Palpi short, convergent. Labial Palpi projecting scarcely more than the length of the head beyond it, median joint long, slightly thickened, terminal joint very short ($\frac{1}{3}$), slender, acute. Haustellum scaled. Head and Thorax smooth. Forewings with the costa slightly arched, apex depressed pointed, termen oblique: neuration 12 veins; 7 and 8 stalked, 7 to costa. Hindwings broader than the forewings, termen scarcely sinuate, apex obtuse; ♂ with a costal fold containing an expansible hair-pencil: neuration 8 veins; 3 and 4 stalked (probably variable); 5 nearly parallel to 3+4; 6 and 7 connate or stalked. Abdomen not flattened. Legs, hind tibiae somewhat roughly clothed.

Closely allied to *Thyrocopa* Meyr., and *Catamempsis* Wlsm., from both of which it differs in the much shorter terminal joint of the palpi and in the structure of the antennae.

26. (1) *Psychra phycidiformis*, sp. nov. (Pl. XIV. fig. 4).

Antennae greyish fuscous, whitish at the base. Palpi whitish, shaded with fuscous externally. Head and Thorax whitish, much shaded above with fuscous (in some specimens almost entirely fuscous). Forewings greyish white, more or less suffused and sprinkled with fuscous throughout; the dark scales aggregated in a spot at the middle of the base, which is diffused downward along the dorsum into a more or less extended dorsal shade; in a large spot on the middle of the fold, almost confluent with a smaller reduplicated spot on the cell above its inner extremity; this is followed by a brownish ochreous shade along the cell, terminating in a transverse fuscous spot on its outer extremity; a series of about six dark costal spots extends from the middle to the apex, a similar series of six lying around the termen at the base of the greyish cinereous cilia; a pale angular band is left, by interruption of the dark shading, commencing between the first two costal spots and running outward half-way between the cell and the apex, thence deflected backward parallel with the termen to the dorsum before the tornus. Exp. al. ♂ 24—26; ♀ 28—30 mm. Hindwings: ♂, rather dark brown; cilia brownish grey: ♀, pale brownish; cilia whitish, slightly speckled. Abdomen: ♂ brown; ♀ whitish; the ovipositor strongly extruded. Legs whitish in both ♂ and ♀.

Type ♂ (27176); ♀ (26719) Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., (1) v. 1894, (10) vi. 1894. Eleven specimens.

The ♂ is a good deal darker than the ♀, by the greater suffusion of the pale ground-colour, and the body and hindwings are considerably darker, the antennae are also somewhat stouter.

27. (2) *Psychra brevipalpis*, sp. nov. (Pl. XIV. fig. 5).

Antennae brownish fuscous, with indistinct pale annulations above. Palpi brownish fuscous, pale cinereous at the end of the median joint. Head pale brownish cinereous. Thorax brownish fuscous, sprinkled with pale cinereous. Forewings dark brownish cinereous, powdered with hoary whitish, more noticeably before the middle of the cell and in an oblique transverse band beyond the cell parallel with the termen; a pair of fuscous spots, scarcely beyond the middle of the cell, are followed by another pair at the end of the cell, these are obliquely placed, the lower one of the first pair nearer to the base than the upper, the upper one of the second pair nearer than the lower; beyond the middle are five fuscous costal spots, one at the apex, and an indistinct series of about six along the termen at the base of the brownish cinereous cilia. Exp. al. 26 mm. Hindwings dark brownish fuscous; cilia brownish fuscous with a dark line running through them near their base. Abdomen dark fuscous banded with dark brownish ochreous. Legs brownish cinereous.

Type ♂ (27853) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895. Unique.

The hindwings are much darker in this species than in *phycidiformis*, Wlsm.

13. CATAMEMPSIS, gen. nov.

(καταμεμψις = discontent).

Type *Catamempsis decipiens* Wlsm.

Antennae strongly serrate anteriorly, with some appearance of biserration towards the apex; biciliate throughout. Maxillary Palpi short, convergent. Labial Palpi recurved, reaching high above the vertex; median joint densely clothed with appressed scales; terminal joint less than half the length of the median (but possibly variable). Haustellum scaled. Head and Thorax smooth. Forewings broad, widening outward, costa arched, termen oblique, not sinuate: neuration 12 veins; 7 and 8 stalked, 7 to apex. Hindwings broader than the forewings, termen very obliquely rounded; ♂ with costal fold containing an expansible hair-pencil: neuration 8 veins; 3 and 4 connate, 6 and 7 stalked (these veins will probably be found variable). Abdomen not flattened. Legs, hind tibiae with appressed scales, flattened.

Closely allied to *Thyrocopa* Meyr., from which it differs in the structure of the antennae of the ♂, thus approaching *Ptychothrix* Wlsm., which however has strongly bipectinate antennae.

28. (1) *Catamempsis decipiens*, sp. nov. (Pl. XIV. fig. 6).

Antennae pale fawn-ochreous, basal joint black. Palpi blackish, sprinkled with white scales externally, and more thickly on their inner sides. Head fawn-brown, mixed with blackish. Thorax dark purplish black. Forewings dull fawn-ochreous, with a purplish black cloud extending from the base along the upper edge of the cell and slightly diffused downward around its outer end where a reduplicate purplish black spot rests on the cross-vein; this is preceded by a single spot of the same colour about the middle of the cell; the termen is very faintly clouded with scattered fuscous scales, on which two or three spots are visible at the base of the pale fawn-ochreous cilia. Exp. al. ♂ 40; ♀ 50 mm. Hindwings brownish grey; cilia pale brownish ochreous. Abdomen brownish grey. Legs whitish ochreous.

Type ♂ (28649); ♀ (28045) Mus. Wlsm.

HAB. OAHU: Near head of Kawailoa Gulch, (1) IV. 1893.—HAWAII: Olaa, (1) IX. 1896 (Type ♀); Olaa, 2000 ft., (1) XI. 1896 (Type ♂). Three specimens (that from Oahu, broken and in very poor condition).

The ♀ has the palpi distinctly paler, being whitish ochreous sprinkled with darker scales, the terminal joint is slightly longer than in the ♂. In the forewings there is less cloudy suffusion, the ground-colour being chalky whitish ochreous. The hindwings also are much paler than in the ♂ and may be described as sericeous whitish. The abdomen is whitish with transverse bands of tawny reddish brown across the segments, the ovipositor is strongly extruded.

This species so greatly resembles *Thyrocopa gigas* Btl., that great care must be taken in separating them. In the case of the ♂ no real difficulty arises owing to the structure of the antennae, but in the ♀ it will be found better to rely upon the comparative length of the terminal and median joints of the palpi; the terminal being much shorter in proportion to the median than in *Thyrocopa gigas*, although there is much variation in their relative lengths in this species.

14. THYROCOPA Meyr.

n. syn. = *SYNOMOTIS* Meyr.

Type (1) *Thyrocopa abusa* Wlsm. (Meyr. 1883).

THYROCOPA Meyr., Ent. Mo. Mag. XX. 32—3 (1883)[1].

1 (Type) *abusa* Wlsm (= **usitata* Meyr.—*nec* Btl.).

Type (2) *Synomotis epicapna* Meyr. (Meyr. 1883)

= *SYNOMOTIS* Meyr., Ent. Mo. Mag. XX. 33 (1883).

1 (Type) *epicapna* Meyr.

Antennae moderate, filiform pubescent; basal joint moderate, simple. Maxillary Palpi short, drooping. Labial Palpi long, recurved; second joint thickened with appressed scales, somewhat rough beneath; terminal joint as long as second, moderate, acute. Tongue moderate. Head smooth, side-tufts short, erect. Thorax smooth. Forewings elongate oblong; with 12 veins. 2 from considerably before angle of cell, 3 from angle, 7 and 8 stalked, 7 to costa. Hindwings trapezoidal, somewhat broader than forewings, hind margin very slightly rounded, cilia short ($\frac{1}{5}$); costal edge folded and bent back above, forming a deep furrow on upper surface, in which lies a very long pencil of hairs (in ♂ only?); with 8 veins, 3 and 4 from a point at angle of cell, 5 parallel to 4, 6 and 7 stalked. Abdomen stout, somewhat depressed, distinctly margined. Legs; posterior tibiae with short, dense, appressed hairs.

This does not nearly approach any described genus, but is allied to the two following genera," [*Synomotis* Meyr., and *Autosticha* Meyr. (= §*Automola* Meyr.)] "which together belong to a peculiar group of the *Gelechiadae*, apparently forming a considerable proportion of the Hawaiian fauna." Meyrick[1].

29. (1) *Thyrocopa gigas* Btl. (Pl. XIV. fig. 7).

Depressaria gigas Btl., Ann. & Mag. NH. (5. s.) VII. 397, No. 33 (1881)[1]. (*Genus*?) *gigas* Meyr., Ent. Mo. Mag. xx. 32 (1883)[2].

Antennae brownish grey, the basal joint brownish fuscous. Palpi with the terminal joint somewhat shorter than the median; median joint ochreous, densely speckled, especially on their outer sides, except at the extreme apex, with black; terminal joint blackish. Head and Thorax dark brown. Forewings varying from dark to paler brown, irrorated with blackish scales; with a reduplicated blackish spot at the end of the cell, and a single spot preceding these on the disc, about half-way to the base; a third spot, on the fold a little beyond the discal spot, is sometimes only faintly indicated; the blackish irroration is especially noticeable in a curved line a little beyond the end of the cell and in the terminal area, these two shades being separated by a paler outwardly bowed fascia scarcely reaching the margins; on the outer half of the costa and along the termen is a series of about twelve blackish marginal spots preceding the cilia which are brownish cinereous, with darker shades running through them. Exp. al. 40—48 mm. Hindwings brownish ochreous, more or less deeply shaded with brownish fuscous, a small blackish spot on the costa immediately before the apex, and a series of less distinct spots around the termen in the base of the cilia which are slightly paler than the wing, but clouded with fuscous on their outer half; underside with a somewhat lunate shade-spot at the end of the cell. Abdomen brownish ochraceous, much clouded transversely with brownish fuscous; the paler bands which mark the segments sometimes accompanied by chestnut-brown scaling; a double series of blackish lateral spots runs along the underside which is pale ochraceous. Legs ochraceous, speckled with blackish.

Type ♂ (119 : 81. 7) *Maui*, Mus. Br. [Caenotype ♂ (27350) Mus. Wlsm.].

HAB. KAUAI: Kaholuamano, 4000 ft., (17) IV. 1895; 3000—4000 ft., (4) VI. 1894 (Perkins).—OAHU: Waianae Mts., 2500—3000 ft., (2) 1892 (Perkins).—MOLOKAI: nearly 5000 ft., (1) 22. IX. 1893 (Perkins).—MAUI: Haleakala, 4000 ft. (Blackburn)[1]; 5000 ft., (3) V. 1896 (Perkins). Twenty-seven specimens.

There is considerable variation in the intensity of colouring in this species; the ♀ appears to be scarce, only two specimens being taken.

30. (2) *Thyrocopa* (?) *viduella*, sp. nov. (Pl. XIV. fig. 8).

Antennae greyish fuscous, the basal joint partly whitish. Palpi with the median joint dark greyish fuscous, slightly speckled; the terminal joint shorter than the median, whitish, speckled with greyish fuscous. Head and Thorax white, the latter sprinkled with greyish fuscous. Forewings greyish fuscous, sprinkled with whitish scales; with an irregular white blotch occupying the outer half of the cell and diffused downward across the fold, containing near its basal extremity a dark fuscous transverse shade and near its outer extremity a dark fuscous curved, or reniform, transverse spot, the space between the two being partly occupied by mixed brownish ferruginous and greyish fuscous scaling; beyond the end of the cell, somewhat abruptly angulated at its outer extremity, is a narrow white transverse fascia commencing on the costa at three-fifths from the base whence it tends obliquely outward, descending from its angle direct to the dorsum before the tornus, on it is a slight suffusion of rusty brownish scales; beyond the fascia are four whitish costal spots before the apex, and the series is continued along the termen, but does not break a dark line running along the middle of the cilia which are greyish fuscous, somewhat paler towards the apex; at the extreme base of the dorsum there is a small whitish spot, and the dark scales near the base of the fold give a chestnut reflection in a strong light. Exp. al. 40 mm. Hindwings shining, bone-white, with a narrow band along their margin shaded with greyish fuscous; cilia shining, bone-white, with some greyish fuscous intermixed towards the apex. Abdomen bone-white, sprinkled and narrowly banded with greyish fuscous. Legs bone-white, the tarsi banded with greyish fuscous.

Type ♀ (27149) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., VI. 1894. Unique.

A very distinct species, the ♂ is at present unknown.

31. (3) *Thyrocopa* (?) *cinerella*, sp. nov. (Pl. XIV. fig. 9).

Antennae pale cinereous, dusted with fawn-brown. Palpi, Head and Thorax pale cinereous, sprinkled with fawn-brown scales. Forewings three times as long as wide, somewhat expanding outward, costa moderately straight, apex depressed, obtuse, termen oblique, not sinuate; whitish cinereous, profusely dusted with fawn-brown scales which are concentrated in a discal patch a little before the middle, in a plical patch scarcely beyond it, and in a large reniform spot at the end of the cell; an indistinct, outwardly bowed, pale band crosses the wing before the profusely shaded terminal and apical area; cilia whitish cinereous. Exp. al. 43—45 mm. Hindwings broader than the forewings; brown-grey; cilia whitish cinereous. Abdomen brown-grey. Legs whitish cinereous, with some brownish sprinkling.

Type ♀ (26986) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., VI. 1894. Two specimens.

The ♂ is at present unknown, but there can be little doubt that this species is congeneric with *Thyrocopa gigas* Btl.

32. (4) *Thyrocopa megas*, sp. nov. (Pl. XIV. fig. 10).

Antennae white, shaded with ochreous outwardly. Palpi white, the median joint sprinkled externally with brownish grey; the terminal joint much shorter than the median, shaded with brownish grey beneath. Head white. Thorax white, sprinkled with brownish grey. Forewings three times as long as broad; white, sprinkled with elongate brownish grey scales which are assembled in a reduplicated patch on the middle of the cell, in another on the fold scarcely beyond it, and in a third at the outer end of the cell from which to the tornus there is a slight suffusion of the same colour; cilia white, sprinkled along their base with brownish grey. Exp. al. ♂ 38—42; ♀ 42 mm. Hindwings broader than the forewings, ♀ shining, silky white, cilia the same, a tuft of long yellowish white hairs from the base of vein 1; ♂ with the ground-colour slightly yellower than in the ♀. Abdomen whitish, with narrow transverse ferruginous bands above. Legs white.

Type ♀ (28215); ♂ (28214) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., V. 1896. Three specimens.

The terminal joint of the palpi is shorter in this species than in *cinerella* Wlsm.

33. (5) *Thyrocopa albonubila*, sp. nov. (Pl. XIV. fig. 11).

Antennae brownish grey, the basal and adjacent joints sprinkled with white. Palpi white, the median joint shaded externally on its basal half with brownish fuscous, sprinkled beyond; terminal joint ($\frac{2}{3}$), sprinkled with brownish fuscous. Head and Thorax white, with brownish grey sprinkling. Forewings white, profusely sprinkled with greyish brown scales, leaving a sinuate, ill-defined white subterminal band half-way between the cell and the termen, parallel with the margin but not reaching the costa; in addition to the profuse sprinkling there are some darker brownish fuscous spots, one at the extreme base of the costa, slightly produced and dilated at the base of the cell, one on the middle of the fold with two others on the cell above it, the first of which is anterior to it and less further removed than the second which is straight above it; a large curved spot lies at the end of the cell with a costal spot above and a little before it; a series of brownish spots is faintly indicated at the base of the white terminal and costal cilia. Exp. al. ♂ 24—30; ♀ 28—30 mm. Hindwings greyish brown, with a whitish crescent-shaped spot at the end of the cell; cilia glossy white. Abdomen, ♂ greyish brown; ♀ white. Legs white.

Type ♀ (26721); ♂ (27094) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (1) V. 1894, (5) VI. 1894. Six specimens.

In some specimens the forewings are more profusely sprinkled and the dark spots less clearly defined. Closely allied to *argentea* Btl., but the markings are arranged somewhat differently. In *albonubila* the three spots along the upper edge of the cell are almost in a line, and the anterior is more widely removed from the median than in *argentea*. In *argentea* the anterior spot is closely approximated to the median and distinctly below it. In both species there is a conspicuous dark spot on the costa before one-third, in *argentea* this spot more distinctly precedes that at the end of the fold than in *albonubila*.

34. (6) *Thyrocopa argentea* Btl.

Depressaria argentea Btl., Ann. & Mag. NH. (5. s.) VII. 399, No. 36 (1881)[1].

Antennae brownish cinereous, whitish towards the base. Palpi whitish, speckled with brownish grey. Head dirty whitish. Thorax brownish grey. Forewings white, profusely speckled and smeared with pale brownish grey, leaving the ground-colour more conspicuous along the cell and in an ill-defined curved band beyond it; there are three pairs of brownish fuscous spots, the first two pairs obliquely parallel, one on the disc the other resting on the fold, the third pair straight at the outer end of the cell; there are also about four diffused costal shade-spots beyond the middle; cilia whitish, reticulated with pale brownish grey. Exp. al. ♂ 20—24; ♀ 24—27 mm. Hindwings pale brownish grey; cilia whitish. Abdomen pale whitish ochreous. Legs white.

Type ♂ (100 : 81. 7) Mus. Br. [Caenotype ♂ (27447); ♀ (27448) Mus. Wlsm.].

HAB. OAHU: Mts., near Honolulu (Blackburn)[1]; near head of Kawailoa Gulch (1) IV. 1893 (Perkins).—HAWAII: Olaa, (10) VII. 1895, (3) IX. 1896 (Perkins). Fourteen specimens.

The ♀ is as a rule slightly paler and with the markings more distinct than in the ♂. Closely allied to *albonubila* Wlsm., under which species the most noticeable differences are noted.

35. (7) *Thyrocopa* (?) *minor*, sp. nov. (Pl. XIV. fig. 13).

Antennae dusty brownish. Palpi whitish cinereous, dusted with brownish fuscous; the terminal joint slender, nearly as long as the median. Head and Thorax whitish cinereous, the latter speckled with brownish fuscous. Forewings whitish cinereous, dusted with brownish fuscous and suffused along the dorsum with pale greyish brown; a dark brownish fuscous spot lies at the base of the costa, touching the upper edge of the cell; a little before the middle is a group of large dark brownish fuscous spots, more or less confluent, the lower one in the middle of the fold, the upper one at the upper edge of the cell straight above it; of the two intermediate ones the anterior is the larger, these are followed beyond the middle by two smaller spots at the outer end of the cell; a series of marginal spots of the same colour around the costa and termen, the five costal, commencing at the middle, being larger than the seven terminal commencing at the apex; a pale band between the cell and the termen is somewhat indistinct; cilia brownish grey, mixed with whitish cinereous; the marginal spots are very noticeable on the underside, running through the cilia and reproduced in the cilia of the hindwings. Exp. al. 19 mm. Hindwings brown; cilia brownish grey, with a brownish line running through them near their base. Abdomen brownish; anal tuft whitish cinereous, ovipositor extruded. Legs whitish, banded with greyish brown.

Type ♀ (26080) Mus. Wlsm.

HAB. MOLOKAI: above 3000 ft., 5. VI. 1893. Unique.

The ♂ is at present unknown, but there can be little doubt that the species belongs to the genus *Thyrocopa.*

36. (8) *Thyrocopa indecora* Btl. (Pl. XIV. fig. 14).

indecora Btl. ♂, = *lactea* Btl. ♀[3].
Depressaria indecora Btl., Ann. & Mag. NH. (5. s.) VII. 397—8, No. 34 (1881)[1].
Depressaria lactea Btl., Ann. & Mag. NH. (5. s.) VII. 398—9, No. 35 (1881)[2]. *Genus?*
indecora Meyr., Ent. Mo. Mag. XX. 32 (1883)[3].

Antennae brownish cinereous, faintly dotted above with fuscous. Palpi with the median joint whitish cinereous, thickly sprinkled with fuscous and pale rust-brown; terminal joint shorter than the median, fuscous, with some pale sprinkling. Head and Thorax brownish ochreous, sprinkled with fuscous. Forewings pale brownish ochreous, sprinkled with pale rust-brown and more profusely with brownish fuscous scales; the latter conspicuous in a small patch at the base of the costa, a large discal patch before the middle extending a little over the fold, a smaller curved patch at the end of the cell, two diffused waved shades between the cell and the termen, a series of five costal spots from middle to apex, and about seven indistinct spots in the basal half of the tawny greyish terminal cilia. Exp. al. ♂ 28—30; ♀ 35 mm. Hindwings pale brownish cinereous, profusely dusted with greyish brown scales; cilia brownish cinereous, with a shade-line running through them near their base. Abdomen tawny fuscous, with pale transverse bands. Legs pale rust-brownish, with whitish tarsal annulations.

Type ♂ (*indecora* Btl., 128 : 81. 7); ♀ (*lactea* Btl., 129 : 81. 7) Mus. Br. [Caenotype ♂ (28220); ♀ (28217) Mus. Wlsm.].

HAB. MAUI: Haleakala, 4000 ft., larva in rotten wood (Blackburn)[1-2]; Olinda (Haleakala), 4000 ft., (1) IV. 1894 (Perkins); Haleakala, 5000 ft., (6) V. 1896 (Perkins). Seven specimens.

The ♀ (described by Butler under the name *lactea*) has the ground-colour of the forewings whitish, irrorated with cinereous and pale fuscous; the hindwings are paler, more cinereous, than in the ♂, and whitish on the underside.

37. (9) *Thyrocopa tessellatella,* sp. nov. (Pl. XIV. fig. 16).

Antennae greyish fuscous; basal joint fawn-grey. Palpi fawn-grey, sprinkled with fuscous. Head and Thorax fawn-grey, the latter sprinkled with fawn-brown and fuscous. Forewings fawn-brown, with pale cinereous and fuscous sprinkling and several blackish spots; after some black scaling along the base of the fold is a conspicuous irregular black spot in the middle of the fold with four others above it on the cell, two before the middle of the wing and two at the end of the cell; the first pair obliquely placed, the upper spot further removed from the base than the lower, the second pair one above the other; along the costa are five blackish spots, one about the middle, the others at regular intervals, diminishing in size to the apex, the series being continued around the apex and termen at the base of the fawn-grey cilia; parallel with the termen a line of pale cinereous scaling curving outward towards the apex reaches the second of the costal spots and nearly extends to the tornus, other scales of the same colour being distributed around the plical and discal spots. Exp. al. 20—22 mm. Hindwings brownish grey; cilia pale cinereous, with a broken brownish grey line running through them near their base. Abdomen brownish grey. Legs cinereous, the hind tarsi somewhat clouded with brownish grey.

Type ♂ (25354) Mus. Wlsm.

Hab. Hawaii: Kona, 4000 ft., (1) vii. 1892, (1) 13. viii. 1892, (1) 17. viii. 1892, (1) ix. 1892 (Perkins); [(1) without locality (Blackburn, 188) Mus. Meyr.]. Five specimens all ♂♂.

38. (10) *Thyrocopa depressariella,* sp. nov. (Pl. XIV. fig. 17).

Antennae umber-brown, with faint paler annulations towards the base. Palpi umber-brown; terminal joint as long as the median, much speckled with pale cinereous. Head and Thorax dark umber-brown, speckled with whitish cinereous above and on the tegulae. Forewings dark umber-brown, with tawny fuscous reflection, profusely speckled with pale cinereous inclining to ochreous (which in the ♀ predominates over the darker suffusion); in the ♀ a very dark umber-brown streak commences at the base of the fold, obscuring the middle of the cell and following its upper margin beyond the middle, reverting along its outer extremity to the lower angle (this in the ♂ is scarcely distinguished from the general dark suffusion of the wing, but a line of pale scaling separates its position from the darkened costa above it); a narrow dark line, sometimes broken into spots, runs along the termen at the base of the brownish cinereous cilia, and a series of five costal spots from above the outer extremity of the cell extends to the apex; a pale, angulated band beyond the end of the cell is more noticeable in the ♀ than in the ♂; underside whitish, with a series of brownish fuscous spots at the base of the cilia. Exp. al. ♂ 24—26; ♀ 26—32 mm. Hindwings whitish, very faintly shaded with pale brownish; cilia whitish, in the ♀ a brown line runs along their base around the apex reaching to vein 1^c; this is sometimes broken into spots, but is absent in the ♂ except at the extreme apex; underside whitish, with some brownish fuscous spots round the apex, these are less distinct in the ♂. Abdomen whitish, with a slight brownish tinge, the margins of the segments marked by pale brownish ochreous bands; ♀ with the ovipositor strongly extruded. Legs whitish ochreous, mottled with brown externally; hind tarsal joints sometimes much clouded with brownish fuscous.

Type ♀ (26856); ♂ (27195) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (1) V. 1894, (10) VI. 1894. Eleven specimens.

Thyrocopa ? sp.

Depressaria sp. Btl., Ent. Mo. Mag. XIX. 180, No. 7 (1883)[1].

HAB. MAUI[1]: IX.[1]

Type. Mus. Br.

39. (11) *Thyrocopa nubifer*, sp. nov. (Pl. XIV. fig. 18).

Antennae very pale ochreous, dotted about with fuscous, the basal joint fuscous above. Palpi pale cinereous, the median joint dusted, the terminal joint suffused with fuscous. Head and Thorax pale cinereous speckled with fuscous. Forewings pale cinereous, profusely dusted with fuscous, which forms a cloud at the base of the costa, a diffused outwardly convex cloud beyond the end of the cell extending to the dorsum, a spot at the middle of the base, a curved spot at the end of the cell preceded by a smaller one before the middle of the wing, with some indication of a plical spot beneath it, and a series of five costal, one apical, and six terminal spots in the base of the pale greyish cinereous cilia. Exp. al. 30—32 mm. Hindwings shining, pale brownish cinereous; cilia whitish cinereous, with some fuscous spots in their base about the apex. Abdomen and legs whitish ochreous; the tarsi slightly clouded with fuscous.

Type ♂ (25174); ♀ (25175) Mus. Wlsm.

HAB. HAWAII: Kona, 4000 ft., (1) 29. VI. 1892, (1) 28. VII. 1892, (1) IX. 1892, (1) 1893. Four specimens.

40. (12) *Thyrocopa seminatella*, sp. nov. (Pl. XIV. fig. 19).

Antennae pale fawn, minutely banded with fuscous above. Palpi pale fawn, shaded externally with fuscous nearly to the apex of the median joint, and at each extremity of the terminal joint. Head and Thorax pale fawn, the latter slightly shaded with brown. Forewings pale fawn, shaded with brown beyond the base, especially across the middle, along the dorsum, and along the lines of the nervures; profusely sprinkled with square black scale-points, except at the base and in a pale space immediately beyond the cell, these are concentrated in a spot on the middle of the disc, and in a reduplicated transverse spot at its outer extremity; along the costa and termen, commencing beyond the middle, is a series of twelve blackish spots—five costal, one apical, five terminal and one tornal; cilia pale fawn, with a broken fuscous shade-line running through their middle. Exp. al. ♂ 26; ♀ 31 mm. Hindwings and cilia shining fawn-whitish, with one apical and four indistinct terminal brownish spots along their base. Abdomen whitish fawn, with narrow brownish bands across the somites. Legs whitish fawn, the tarsi speckled with brown.

Type ♀ (27521); ♂ (27523) Mus. Wlsm.

HAB. KAUAI: Halemanu, 4000 ft., V. 1895. Two specimens.

41. (13) *Thyrocopa pulverulenta*, sp. nov. (Pl. XIV. fig. 20).

Antennae cinereous, faintly banded with fuscous above. Palpi fawn-brown, speckled with white scales, a whitish spot at the apex of the median joint, the terminal joint inclining to fuscous, but also speckled with white. Head and Thorax fawn-brown. Forewings fawn-brown, with dark brown spots and dusting; from the base is a broad costal streak extending to about one-third, profusely speckled with white and dark brown, and beyond the middle are five dark brown costal spots; along the fold, commencing at the base, runs a broken streak of dark brownish fuscous nearly to half the wing-length; above it is a dark fuscous spot on the middle of the cell, and another transverse spot at its outer extremity, accompanied before and behind by scattered dark scales; a broad dark brown shade occupies the terminal portion of the wing, somewhat broken by paler intervals between the veins; cilia very pale fawn. Exp. al. 23—26 mm. Hindwings rather shining, pale brownish cinereous, with a slightly darker brownish shade following the margin throughout and forming a line in the base of the whitish cinereous cilia. Abdomen very pale fawn-brownish. Legs whitish cinereous, the hind tarsal joints faintly shaded with fawn-brownish.

Type ♂ (25255) Mus. Wlsm.

HAB. HAWAII: Kona, 4000 ft., (1) 29. VI., (1) 1. VII., (2) VII., (1) 13. VIII., (1) 17. VIII., (2) VIII., (2) 9. IX., (1) IX. (Perkins 1892).

In some varieties the prevailing colour is whitish cinereous, thickly bestrewn with brownish and greyish fuscous scales, except on an indistinct, outwardly curved, narrow transverse band at three-fourths from the base, with a faint indication of costal spots between this and the apex (25233).

42. (14) *Thyrocopa epicapna* Meyr. (Pl. XIV. fig. 21).

Synomotis epicapna Meyr., Ent. Mo. Mag. xx. 33—4 (1883)[1].

"Antennae, Palpi, Head and Thorax pale fuscous, mixed with dark fuscous and ochreous-whitish. Forewings moderate, oblong, costa gently arched, apex almost acute, hind margin [=termen] slightly sinuate, moderately oblique; pale fuscous, densely irrorated with darker fuscous; an indistinct, short, linear, dark fuscous mark in middle of disc; the three discal dots hardly indicated; faint traces of a paler angulated posterior transverse line: cilia pale fuscous, irrorated with darker fuscous. Exp. al. 16—17 mm. Hindwings whitish-grey, more whitish towards base; cilia whitish, with two grey lines. Abdomen ochreous-whitish. [Legs]: anterior and middle legs fuscous, with ochreous-whitish rings at apex of joints; posterior legs ochreous-whitish, sprinkled with fuscous." (Meyr.[1]).

Type ♂ (3568 Wlsm.) Mus. Meyr.

HAB. HAWAIIA[1]. (Blackburn—four specimens in poor condition. Mus. Meyr.).—KAUAI: Makaweli, sea-level, (2) IV. 1895 (Perkins).—HAWAII: Kona, 4000 ft., (2) 13. VIII. 1892 (Perkins).

Perhaps a small form of *pulverulenta* Wlsm., but the original specimens are not in sufficiently good condition for critical comparison. The Kauai and Hawaii specimens vary but appear to be *epicapna* Meyr.; more material is however required to decide this with certainty.

43. (15) *Thyrocopa alterna*, sp. nov. (Pl. XIV. fig. 22).

Antennae pale ochreous, spotted above with fuscous, basal joint fuscous above. Palpi pale brownish ochreous, thickly smeared with fuscous on the median joint externally, terminal joint fuscous. Head dark brownish ochreous. Thorax fuscous in front, pale brownish ochreous behind. Forewings pale brownish ochreous, with a broad dark fuscous band along the costa from base to two-thirds, where it is depressed and diffused outward, angulated beyond the end of the cell and reverting by the lower angle of the cell to the fold, becoming more diffused in its descent; a little beyond the middle of the cell, but before the wing-middle, is a conspicuous dark fuscous spot followed by a transverse spot at the end of the cell; a slight shade of diffused fuscous scales on the fold below the first spot, and along the dorsum except at the base; a series of obscure fuscous marginal spots around the apex and termen, connected by a fuscous line at the base of the pale brownish ochreous terminal cilia. Exp. al. 25 mm. Hindwings pale cinereous, profusely sprinkled with brownish grey scales; a brownish grey dividing line near the base of the whitish cinereous cilia. Abdomen brownish grey, with narrow transverse bands of rust-brown scales above. Hind legs whitish ochreous; the hind tarsi banded with fuscous.

Type ♂ (28225) *Maui*, Mus. Wlsm.

HAB. MAUI: Olinda (Haleakala), 4000 ft., (1) V. 1896; Haleakala, 5000 ft., (2) V. 1896.—HAWAII: Hilo, 2000 ft., (1) I. 1896. Four specimens.

44. (16) *Thyrocopa immutata*, sp. nov. (Pl. XIV. fig. 23).

Antennae pale brown, with darker spots above at the base. Palpi pale brown, the terminal joint dark tawny brown. Head and Thorax brown, the latter with a tawny suffusion. Forewings brown, with a tawny vinous suffusion, except on the outer fourth; a basal streak on the fold, a spot on the middle of the fold, a discal spot above and before it, and a reduplicated spot at the end of the cell, all tawny fuscous; cilia pale brownish. Exp. al. 26—28 mm. Hindwings and cilia pale yellowish brown. Abdomen and Legs pale brownish ochreous.

Type ♂ (27760) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895. Two specimens.

45. (17) *Thyrocopa fraudulentella*, sp. nov. (Pl. XIV. fig. 24).

Antennae brownish fuscous above, paler beneath, with faint paler annulations. Palpi brownish fuscous, median joint thickly speckled with pale cinereous. Head and Thorax brownish fuscous, with some cinereous sprinkling. Forewings cinereous, with a slight ochreous tinge; the pale ground-colour almost entirely suffused with dark brownish fuscous in which the usual discal and plical spots are plainly visible, the first discal being placed a little before the plical, those at the end of the cell being paired one above the other; the costa is spotted beyond the middle, the series being continued around the termen; the tendency to ochreous colouring is more visible between the costal spots than elsewhere, the pale ante-terminal shade is ill-defined and scarcely visible in some specimens; cilia slightly paler than the wings. Exp. al. 26—28 mm. Hindwings brownish grey, paler and more glossy towards the base; cilia shining pale cinereous. Abdomen corresponding to the colour of the hindwings. Legs pale cinereous; hind tarsi somewhat shaded in the ♀.

Type ♂ (28728); ♀ (28732) *Hawaii*, Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., (1) V. 1896.—HAWAII: Mt. Kilauea, (5) VIII. 1896; Kona, 4000 ft., (1) 13. VIII. 1896; Olaa, (1) IX. 1896. Eight specimens.

46. (18) *Thyrocopa pallida*, sp. nov. (Pl. XIV. fig. 25).

Antennae sandy ochreous, shaded and somewhat annulate with brownish fuscous in the ♂ (sometimes unshaded in the ♀). Palpi whitish cinereous; terminal joint nearly as long as the median, umber-brown; median joint much speckled with umber-brown, especially in the ♂. Head and Thorax umber-brown in the ♂, much speckled with pale cinereous (sometimes varying to sandy ochraceous in the ♀). Forewings cinereous (varying to ochraceous in the ♀), much speckled and suffused with brownish fuscous in the ♂ (less so in the ♀); a plical spot, slightly preceded by a discal one above it, and a reduplicated spot at the end of the cell are dark fuscous (these are less apparent in the ♀, but exist in the same positions); the apex and termen are somewhat spotted with fuscous in both sexes, the cilia being slightly paler than the general wing-colour, but the tendency is for the ♂ to be much darker than the ♀ in all respects; in both sexes there is an outwardly angulated ill-defined pale wave-line beyond the end of the cell, running parallel to the termen and reverting inward toward the costa. Exp. al. 24—26 mm.

Hindwings, ♂ whitish, with a slight buff-brown gloss; ♀ straw-white, with some slight sprinkling of brownish fuscous scales towards the termen, a few brown spots at the base of the pale cilia being generally more noticeable in the ♀ than in the ♂. Abdomen corresponding in colour with the hind wings. Legs of the same colour, but in some of the darker specimens the hind tarsal joints are a good deal shaded with brownish fuscous.

Type ♂ (27645 *Kauai*); [♀ (26187 *Molokai*)] Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (4) IV. 1895; Mts., 3000—4000 ft., (4) VI. 1894.—MOLOKAI: about 4000 ft., (1) 22. V., (1) 9. VI., (1) VI., 1893; above 3000 ft., (1) 30. V., (1) 13. VI. 1893. Thirteen specimens.

There is only a single ♀ from Kauai (27647). This very possibly belongs to another closely allied species; it has the forewings somewhat narrower and straighter than the Molokai specimens (all ♀♀), which therefore agree much better with the ♂ from Kauai.

47. (19) *Thyrocopa adumbrata*, sp. nov. (Pl. XIV. fig. 26).

Antennae pale brownish cinereous, spotted above with fuscous. Palpi pale brownish cinereous, speckled externally with brownish fuscous. Head and Thorax pale brownish cinereous, the latter shaded with fuscous. Forewings pale brownish cinereous, a pale fuscous spot about the middle of the cell, with a few similar scales below it on the fold; another spot at the outer end of the cell and a slight shade of the same at the apex, attenuated along the termen to the middle of the dorsum; cilia whitish cinereous. Exp. al. 24 mm. Hindwings and cilia shining, silky whitish. Abdomen yellowish white, narrowly banded with pale ochreous mixed with fuscous scales. Legs very pale ochreous.

Type ♀ (25314) Mus. Wlsm.

HAB. HAWAII: Kona, 3000 ft., IX. 1892. Unique.

This single specimen is closely allied to *pallida* Wlsm., but appears to differ slightly in the form of the hindwings which are broader and shorter; the cilia are unspotted. In the forewings the marginal spots on the underside are less apparent, and on the upper side the spot at the end of the cell is not reduplicated—in other respects it would be exceedingly difficult to separate them.

48. (20) *Thyrocopa inermis*, sp. nov. (Pl. XIV. fig. 27).

Antennae pale brownish cinereous, dotted along the upper side with tawny brown. Palpi tawny brownish, sprinkled with pale cinereous. Head pale cinereous. Thorax tawny brownish. Forewings tawny brownish, with an indistinct darker spot at the middle of the base, another at the end of the cell, and a third half-way between them; cilia tawny brownish, tipped with pale cinereous. Exp. al. 26—32 mm. Hindwings and cilia whitish cinereous. Abdomen cinereous, inclining to ochreous at the sides and on the anal tuft. Legs whitish cinereous, the tarsi banded above with tawny brown.

Type ♂ (25320); ♀ (25751) Mus. Wlsm.

Hab. Hawaii: Kona, 3000 ft., (♂) ix. 1892; about 5000 ft. (♀) 4. vii. 1892. Two specimens.

49. (21) *Thyrocopa usitata*, Btl. (Pl. XIV. fig. 28).

Depressaria usitata Btl., Ann. & Mag. NH. (5. s.) vii. 396, No. 32 (1881)[1].

Antennae fuscous. Palpi fuscous, sprinkled with pale cinereous, more profusely on the inner side of the median joint. Head brownish fuscous. Thorax tawny fuscous. Forewings tawny fuscous, irrorated with dull fawn-ochreous scales which form an indistinct fascia parallel with the termen; an indistinct dark fuscous spot, with another beyond and below it in the fold, precedes a similar spot at the end of the cell; cilia tawny fuscous, with a darker line near their base; underside shining fuscous, costa unspotted. Exp. al. 23—26 mm. Hindwings and cilia dark brownish cinereous, with a darker line running through the latter near their base. Abdomen brownish cinereous, with a greyish tinge above. Legs pale brownish cinereous, the tarsi broadly banded with tawny fuscous.

Type ♀ (No. 69 : 81. 7) Mus. Br. [Caenotype ♂ (27849); ♀ (27175) *Kauai*, Mus. Wlsm.].

Hab. Kauai: Kaholuamano, 4000 ft., (6) iv. 1895; Mts., 3000—4000 ft., (2) v. 1894.—Oahu: probably from Honolulu[1]; near head of Kawailoa Gulch, (1) iv. 1893.—Hawaii: Mt. Kilauea, (3) viii. 1896. Twelve specimens.

Close allied to *epicapna* Meyr., and *abusa* Wlsm., but differing from both in its larger size and darker hindwings, and its more leaden and shining appearance.

50. (22) *Thyrocopa abusa*, sp. nov. (Pl. XV. fig. 1).

n. syn. = **usitata* Meyr. (nec Btl.).

*Thyrocopa *usitata* Meyr., Ent. Mo. Mag. xx. 33 (1883)[1].

Antennae sordid fawn, faintly annulate. Palpi fawn, profusely dusted with dark fawn-grey, the terminal joint shaded throughout with the same. Head and Thorax fawn, with darker scales thickly intermixed. Forewings fawn-ochreous, profusely dusted with dark fawn-grey, especially towards the base and in a scarcely distinguishable shade-band around the outer end of the cell; a discal spot, at two-fifths from the base, scarcely precedes a plical spot beneath it, and is followed by a spot at the end of the cell (sometimes reduplicated) above which commences a series of five, rather oblique, costal spots of the same colour continuing to the apex, all these are fuscous; cilia of the same colour as the forewings, exhibiting traces of a darker shade-line along their base. Exp. al. 18—24 mm. Hindwings rather shining, whitish ochreous, with pale fawn suffusion, especially on the outer half, extending over the pale cilia. Abdomen whitish ochreous. Legs very pale fawn-ochreous.

Type ♂ (3572, Wlsm. Det.); ♀ (3556, Wlsm. Det.) Mus. Meyr.

HAB. HAWAIIA[1]. [? OAHU (3) Blackburn.]—OAHU: Waianae Mts., 2000—3000 ft., (2) IV. 1892 (Perkins); Honolulu, (1) 29. VIII. 1883 (Meyrick). Six specimens.

On comparing Mr Meyrick's specimens, determined by him as *usitata* Btl., on which he founded the genus *Thyrocopa*, I am compelled to regard them as representing a species distinct from Dr. Butler's type. It is possible that the error originated through the Rev. T. Blackburn having retained in his own collection specimens erroneously regarded as representing his No. 69, which he sent to the British Museum. The chief points of difference appear to be that the true *usitata* Btl. has darker, less powdery, and more uniformly coloured forewings, and very distinctly darker hindwings, the whole insect being more shiny with a slight purplish gloss which is not apparent in Meyrick's specimens. The ♀ is larger than the ♂, but the average size of specimens is certainly smaller than that of the true *usitata* Btl.

The above description is taken from a ♂ in fair condition which was one of the original types of **usitata* Meyr. (nec Btl.) from which the genus *Thyrocopa* Meyr. was described.

51. (23) *Thyrocopa subahenea*, sp. nov. (Pl. XV. fig. 2).

Antennae pale brownish ochreous, faintly barred above with brown. Palpi and Head pale brassy brownish. Thorax dark tawny greyish. Forewings pale brassy brownish, with a tawny suffusion, with the usual two discal spots and one plical a little beyond the first discal; the tawny suffusion yields to an indistinct band of the brassy ground-colour curved outward beyond the end of the cell and diffused in faint radiating lines along the apical and terminal veins; cilia pale brassy brownish. Exp. al. 22—25 mm. Hindwings and cilia bronzy brownish grey. Abdomen greyish, with transverse chestnut-brown bands. Legs pale cinereous, shaded with bronzy brownish.

Type ♂ (26336); ♀ (26335) Mus. Wlsm.

HAB. MOLOKAI: 3000 ft., 6. IX. 1893. Two specimens.

52. (24) *Thyrocopa leonina*, sp. nov. (Pl. XV. fig. 3).

Antennae pale tawny. Palpi tawny; the terminal joint shorter than the median. Head tawny, face greyish. Thorax tawny, with a greyish suffusion. Forewings elongate, somewhat acute, the costa slightly arched, termen very oblique; tawny, with a single dark tawny fuscous spot at the upper angle of the cell (no other visible markings); cilia tawny grey. Exp. al. 22 mm. Hindwings and cilia shining, pale brownish cinereous. Abdomen and legs pale brownish cinereous.

Type ♂ (26434) Mus. Wlsm.

HAB. LANAI: 2000 ft., II. 1894. Unique.

53. (25) *Thyrocopa* (?) *geminipuncta*, sp. nov. (Pl. XV. fig. 4).

Antennae very pale ochreous, the basal joint dusted with brown. Palpi very pale ochreous, dusted externally with fawn-brown; the terminal joint shorter and somewhat more slender than the median. Head and Thorax very pale ochreous. Forewings very pale ochreous, shaded on the apical third and along the outer half of the cell with fawn-brown; a single small dark brown spot on the middle of the cell is followed by two similar spots, one above the other, at the end of the cell; there is an indication of a minute dark brown dot in the fold below and beyond the first discal spot; cilia whitish ochreous, shaded with brownish grey. Exp. al. 21 mm. Hindwings pale, shining, whitish cinereous; cilia white. Abdomen whitish cinereous. Legs whitish ochreous.

Type ♀ (26318) Mus. Wlsm.

Hab. Molokai: 4500 ft., 17. ix. 1893. Unique.

The ♂ is unknown, but the type agrees in structure with the ♀ of *Thyrocopa* to which genus it is doubtless rightly referred.

54. (26) *Thyrocopa* (?) *mediomaculata*, sp. nov. (Pl. XV. fig. 5).

Antennae blackish. Palpi blackish, sprinkled with greyish white; the terminal joint fully as long as the median. Head and Thorax blackish, sprinkled with greyish white. Forewings greyish white, very thickly sprinkled with fuscous, with some black scaling at the base; a large black rounded patch slightly before the middle of the wing and a smaller blackish spot at the end of the cell, a faint indication of three darkened costal patches before the apex and some blackish scaling along the base of the stone-grey terminal cilia. Exp. al. 28 mm. Hindwings pale cinereous, profusely sprinkled throughout with brownish grey scales; cilia pale cinereous, a shade-line running through them near their base. Abdomen greyish fuscous, sprinkled with whitish, with narrow chestnut-brown bands above. Legs greyish fuscous, much sprinkled with whitish, the tarsi with whitish annulations.

Type ♀ (28125) Mus. Wlsm.

Hab. Maui: Haleakala, crater, x. 1896. Unique.—[? Hawaii: Kona, 4000 ft., (1) 4. viii. 1892.]

It is probable that a new genus is indicated by this specimen, but in the absence of the ♂ this cannot be determined. The hindwings are narrower than in the typical forms of *Thyrocopa*, and in the forewings veins 7 and 8 are stalked for the greater part of their length. A ♀ from Kona (28685) without a head and in very poor condition probably belongs to this species.

II. OECOPHORIDAE Meyr.

15. ETHMIA Hb.

Type *Tinea auriflueella* Hb. (=**pyrausta* Hb.).

ETHMIA Hb., Verz. bek. Schm. 163 (1822 ?).

=*PSECADIA* Hb. (1826); =*ANESYCHIA* Hb. (1826); =*DISTHYMNIA* Hb. (1826); =*MELANOLEUCA* Stph. (1829); =*AEDIA* Dp. (1836); =*CHALYBE* Dp. (1836).

55. (1) *Ethmia colonella*, sp. nov. (Pl. XV. fig. 6).

n. syn. =**hilarella*, Btl. (nec Wkr.).

=*Azinis* **hilarella* Btl., Ent. Mo. Mag. XIX. 180 (1883)[1] [nec Wkr.].

Antennae pale slaty grey, the basal joint with a black spot at each extremity above. Palpi pale slate-grey, with a black spot near the base of the median joint externally, and two black rings around the short terminal joint. Head and face pale slaty grey, a black spot on the crown between head and thorax. Thorax slaty grey, with six black spots in two lines of three, the anterior pair situated on the tegulae. Forewings slaty grey, with several black spots (from fifteen to eighteen) situated as in other allied species; one at base of costa, two below costa, both on basal fourth, one at the middle of the base, one near it on the fold, another at one-fourth at lower edge of fold, one large, on disc above middle, another below and beyond it in the fold, two below the fold, and a group of seven or eight around the outer end of the cell extending towards the apex; besides these there are seven marginal spots along the termen; the spots are faintly outlined with a paler shade of slaty grey, especially the discal spot which is slightly elongate, its pale margin being diffused back and forward; cilia slaty grey on their basal half, slightly darker on their outer half. Exp. al. 21—26 mm. Hindwings yellow-ochreous, the apex fuscous, the fuscous shade diffused inwards at an angle, reaching to the end of the cell; apical cilia greyish fuscous, the remainder pale yellow-ochreous. Abdomen bright yellow-ochreous, with seven black spots above, and four or five on either side beneath. Legs ochreous, the tarsi broadly banded with black.

Type ♂ (28751); ♀ (28752) Mus. Wlsm.

HAB. HAWAIIA[1]. OAHU: Honolulu. Larva on . . . . ? . . . . (an introduced plant) excl. X.—XI. 1896. Nineteen specimens.

This species, which much resembles *bicolorella* Gn., and *oculigera* Mschl., differs from both in having six or seven black spots on the upper side of the abdomen. These are absent in *bicolorella* and in the species occurring in Formosa which Dr. Butler regarded as identical with the Hawaiian species and with *hilarella* Wkr. *E. oculigera* differs from *colonella* in having four thoracic spots, not six, and in having only two or three black spots on the upper side of the abdomen posteriorly.

Azinis hilarella Wkr. is the ♀ of *Theoxenia penicillata* Wlsm., the latter names must sink as synonyms. No confusion can arise between *Azinis hilarella* ♂ and any species of *Ethmia*, the large mat of scales on the underside of the hindwings, which are black above except in the flexal region, at once distinguish it. *Azinis hilarella* ♀, which is with difficulty distinguished from some of the species of *Ethmia*, by appearance only, may be at once recognised by the transverse vein connecting the discoidal vein to vein 8. The true genus *Azinis* Wkr. (= *Theoxenia* Wlsm.) has as yet only been recorded from Ceylon.

No other species belonging to the *Oecophoridae* occurring in Hawaiia and *colonella* being confined to gardens in Honolulu, where it feeds on a cultivated plant, at present unrecorded, it is probable that the species has been introduced with the plant on which it feeds from one of the groups of islands. Mr Perkins noted it as "common at Honolulu —introduced."

III. HYPONOMEUTIDAE.

= *ELACHISTIDAE* Meyr. + *PLUTELLIDAE* Meyr.

16. Batrachedra Stn.

Type (1) *Gracillaria praeangusta* Hw. (Stn. 1854).

BATRACHEDRA Stn., Ins. Br. Lp. Tin. 225, 230—1, No. 4, Pl. VII. 5^{a-c} (1854); Meyr., HB. Br. Lp. 661, No. 4 (1895): Pr. Lin. Soc. NSW. XXII. 299, 300—1 (1897).

Type (2) *Batrachedra syrraphella* Wlsm.

Antennae $\frac{3}{4}$, stout, simple, without pecten or eye-cap. Labial Palpi slender recurved, divergent, smooth; terminal joint shorter than the median. Maxillary Palpi minute. Haustellum well-developed. Head and Thorax smooth; face rather retreating. Forewings elongate, lanceolate: neuration 10 veins (7 + 8 coincident, 4 + 5 coincident); 6 and (7 + 8) stalked, enclosing the apex. Hindwings narrow, lanceolate, acute, cilia 3—$3\frac{1}{2}$; ♂ with strong expansible subcostal hair-pencil from near base on upper side: neuration 6 veins (2 + 3 + 4 coincident); 5 and 6 stalked, arising from media; media connected with radius by a short inwardly oblique vein; 2 + 3 + 4 coincident, forming continuation of cubitus; cell open between cubitus and media. Abdomen slender, smooth. Legs, hind tibiae with fugitive hairs.

The above description was written before it was recognised that *syrraphella* was not sufficiently distinct from the type of *Batrachedra* to be worthy of a geneonym, similar developments occurring within *Pyroderces* as defined by Meyrick, and *Hyposmocoma*. Sexual tufts in the *Hyponomeutidae* appear to be of only special value, and Meyrick's redescription of *Batrachedra* should be extended to include species with a subcostal hair-pencil on the hindwings in the ♂.

56. (1) *Batrachedra syrraphella*, sp. nov. (Pl. XV. fig 7).

Antennae pale ochreous. Palpi whitish, with a narrow brownish transverse band on each joint externally. Head creamy whitish. Thorax very pale yellowish ochreous. Forewings very pale yellowish ochreous, with indistinct greyish brown spots and shading, the former distributed over the basal half of the wing above and below the fold, the latter confined to the outer half, where it assumes the form of three or four costal streaks merging obliquely outward in a central shade, becoming darker towards an apical point, beyond which a reduplicated dark brownish line curves around the apex in the basal half of the pale straw-grey cilia. Exp. al. 7—9 mm. Hindwings and cilia pale straw-grey ; ♂ with ochreous subcostal hair-pencil. Abdomen very pale yellowish ochreous. Legs whitish, with seven or eight brownish cross-bands on the tibiae and tarsi externally.

Type ♂ (25862) ; ♀ (25864) *Oahu*, Mus. Wlsm.

Hab. Oahu : Waianae Mts., about 2000 ft., (11) iv. 1892.—Hawaii : Mt. Kilauea, (1) vi. 1895, (1) viii. 1896 ; Kona, 4000 ft., (4) 12. viii.—8. ix. 1892 ; Kaawaloa (Kona) above 2000 ft., (1) ix. 1892. Eighteen specimens.

57. (2) *Batrachedra ephelus*, sp. nov. (Pl. XV. fig. 8).

Antennae pale straw-whitish. Palpi white, a broad brownish grey band on the median joint and two on the terminal joint externally. Head white, slightly shaded above with brownish grey. Thorax dirty whitish. Forewings shining, straw-white, faintly yellowish tinged, with several brownish grey spots and freckles, some near the base above and below the fold, three across the middle of the wing placed triangularly, several smaller beyond the cell and a slight shade along the costa ; there are also three costal spots on the outer third, with three opposite dorsal spots and one at the apex, all rather darker, tending to brownish fuscous ; cilia at the apex straw-whitish, on the dorsum lilac-grey. Exp. al. 10—11 mm. Hindwings tawny brownish grey ; cilia lilac-grey, with greenish iridescence ; ♂ with ochreous subcostal hair-pencil. Abdomen straw-whitish. Legs straw-white ; tibiae and tarsi spotted on their outer side with brownish grey.

Type ♂ (26199); ♀ (26308) Mus. Wlsm.

Hab. Molokai : above 3000 ft., 5. vi. 1893, 4500 ft., 7. ix. 1893.

58. (3) *Batrachedra bedelliella*, sp. nov. (Pl. XV. fig. 9).

Antennae brownish grey, with blackish bars above. Palpi whitish cinereous, tipped with brownish grey. Head and Thorax brownish grey ; face white. Forewings brownish grey, showing confused pale cinereous mottling, very obscurely indicated, the whole wing, except under a strong lens, having a unicolorous dull brownish grey appearance ; cilia brownish grey. Exp. al. 8—9 mm. Hindwings dark brownish grey ; cilia brownish grey; ♂ with dark grey expansible subcostal hair-pencil. Abdomen greyish fuscous, anal tuft inclining to ochreous. Legs brownish grey, tarsi slightly paler.

Type ♂ (26548) *Maui*, Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., (4) III.—IV. 1894.—MOLOKAI: forest above Pelekunu, (1) VIII. 1893. Five specimens.

59. (4) *Batrachedra microstigma*, sp. nov. (Pl. XV. fig. 10).

Antennae pale fawn-ochreous. Palpi whitish, with three fuscous annulations, one near the end of the median joint and two on the terminal joint. Head and Thorax very pale fawn-ochreous. Forewings very pale fawn-ochreous (varying to whitish cinereous), slightly shaded with a sprinkling of brownish scales along the fold and around the apex; a small fuscous spot on the middle of the fold is succeeded by another above and beyond it on the cell, a third lying at the lower angle of the cell, the concentration of the dark scaling on the costa forms an indistinct spot above the latter; cilia pale fawn-ochreous. Exp. al. 8—10 mm. Hindwings very pale greyish ochreous; cilia pale fawn-ochreous; ♂ without subcostal hair pencil. Abdomen and Legs very pale fawn-ochreous; the tarsi slightly speckled with brownish fuscous.

Type ♂ (25141) *Oahu*, Mus. Wlsm.

HAB. OAHU: Waianae Mts., 2000 ft., (2) IV. 1892.—HAWAII: Kona, above 2000 to 4000 ft., (5) 13. VIII.—8. IX. 1892; Kaawaloa (Kona), above 2000 ft., (1) IX. 1892. Eight specimens.

60. (5) *Batrachedra supercincta*, sp. nov. (Pl. XV. fig. 11).

Antennae straw-whitish. Palpi whitish, slightly shaded before the end of the median joint. Head and Thorax whitish. Forewings shining, pearl-whitish, with a brownish grey shade along the costa from base to apex; this is dilated at the middle, forming a rather abrupt excrescence reaching to the fold; about the end of the cell is a dark brown spot, also connected at its upper edge with the costal shade; cilia tawny brownish grey. Exp. al. 8—9 mm. Hindwings pale grey; cilia tawny brownish grey; ♂ without subcostal hair-pencil. Abdomen brownish grey (? *greasy*). Legs pearly whitish, with grey tarsal bands.

Type ♀ (26591); ♂ (26543) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., III.—IV. 1894. Two specimens.

61. (6) *Batrachedra ruficiliata*, sp. nov. (Pl. XV. fig. 12).

Antennae shining, pale brownish cinereous. Palpi white, a brownish annulus near the base of the terminal joint, and a spot of the same colour on the median joint externally. Head and Thorax white; tegulae touched with brown. Forewings shining white, with a brownish fuscous streak running from the base along the costa to the middle, thence slightly bent downward, dilated to the end of the cell, and attenuated beyond it to the apex, its outer half reaching the costa only in interspaces between four oblique white costal spots; a slight shade runs along the dorsum from the base, terminating in an elongate spot on the fold, a similar spot on the margin at the tornus; cilia at the apex whitish, with a brownish line at their base, and brown shading at their outer ends, tornal cilia tawny red. Exp. al. 9 mm. Hindwings grey, with tawny red cilia; ♂ without subcostal hair-pencil. Abdomen brownish. Legs shining white, with brownish fuscous tarsal spots.

Type ♂ (25579) Mus. Wlsm.

Hab. Hawaii: Kona, above 2000 ft., ix. 1892. Unique.

62. (7) *Batrachedra lomentella*, sp. nov. (Pl. XV. fig. 13).

Antennae pale fawn, faintly spotted above with brownish. Palpi white, with a fuscous spot externally on the median joint, before its apex, and two fuscous rings around the terminal joint. Head shining white. Thorax fawn-colour. Forewings fawn-brownish, becoming dark brown toward the costa; an elongate median white costal spot sends out a slender white line obliquely to the lower edge of the cell and is diffused to the dorsum before the tornal cilia; this is followed by three outwardly oblique, slender, short white costal streaks, set in dark brownish fuscous, which is continued around the apex in a slender line at the base of the cilia, reduplicated in a second line along their middle—a whitish streak lies along the termen within the first line; cilia brownish ochreous above the apex and between the two marginal lines, whitish at their outer extremities and about the tornus. Exp. al. 8—9 mm. Hindwings grey, with pale tawny grey cilia; ♂ without subcostal hair-pencil. Abdomen brownish grey. Legs white, tibiae with broad oblique greyish fuscous streaks on their outer sides posteriorly; a narrower streak and three fuscous spots on the tarsi; spurs white, the outer ones streaked with fuscous externally.

Type ♂ (26013); ♀ (26010) Mus. Wlsm.

Hab. Oahu: Waianae Mts., about 2000 ft., iv. 1892. Six specimens among dead fern leaves.

63. (8) *Batrachedra sophroniella*, sp. nov. (Pl. XV. fig. 14).

Antennae brownish fuscous above, whitish beneath. Palpi white, with two fuscous spots externally, one at the end of the median, the other at the base of the terminal joint which is also minutely tipped with fuscous. Head cream-white. Thorax greyish, the tegulae partly cream-white. Forewings with the costa and dorsum chiefly brownish fuscous, the discal area being cream-whitish to beyond the middle, forming a broad undulating streak, commencing at the middle of the base, dilated outward and downward towards the dorsum, then again contracted by the encroachment of a semi-circular fuscous dorsal patch, and thence again depressed nearly to the dorsum where it blends with a pale ferruginous streak which is continued nearly to the apex; three oblique white costal streaklets above it and a slender whitish terminal line below it, the latter margined outwardly by a narrow fuscous line around the apex at the base of the greyish cinereous cilia, a fuscous shade running through them around the apex. Exp. al. 11 mm. Hindwings and cilia grey. Abdomen [missing]. Legs whitish, the tibiae obliquely streaked externally, and the tarsi conspicuously banded with fuscous, the five bands diminishing in width from the base.

Type ♀ (25653) Mus. Wlsm.

HAB. OAHU: near head of Kawailoa Gulch, IV. 1893. Unique.

17. AGONISMUS, gen. nov.

(ἀγωνισμός = rivalry.)

Type *Agonismus flavipalpis* Wlsm.

Antennae (♀) ⅔, serrate on outer half, smooth towards base; basal joint subpectinate, slightly enlarged outwardly. Labial Palpi scarcely recurved, divergent; terminal joint short, obtuse; median joint slightly enlarged outwardly. Maxillary Palpi minute, dependent. Haustellum well-developed. Head and Thorax smooth; face receding. Forewings scarcely three times as long as wide, costa slightly sinuate, apex obtusely rounded, not sensibly depressed, dorsum rounded: neuration 12 veins; 7 and 8 stalked, connate with 9, 7 to costa, 6 separate; 1^b basally furcate. Hindwings half as broad as the forewings, lanceolate, acute, with rounded dorsum and straightish costa; cilia 2½: neuration 8 veins; 6 and 7 stalked, cell widely removed from costa through coincidence of radius with media before origin of $6+7$, other veins separate. Abdomen smooth; ♀ with ovipositor extruded. Legs slightly clothed with long appressed hairs which project beyond the hinder spurs.

Intermediate between *Hyposmocoma* Btl. and *Batrachedra* Stn.

64. (1) *Agonismus flavipalpis*, sp. nov. (Pl. XV. fig. 15).

Antennae fuscous, yellow at the base beneath, annulate beyond with pale yellow. Palpi bright yellow, with two fuscous spots beneath the short terminal joint. Head shining fuscous. Thorax purplish fuscous. Forewings rich shining reddish purple, dusted with golden ochreous scales, a pale ochreous dorsal streak arising at about one-fifth from the base and reaching to the fold; cilia around the apex bright purple, fading to dull tawny grey about the tornus. Exp. al. 9 mm. Hindwings dull greyish fuscous; cilia dark tawny greyish. Abdomen fuscous. Hind Legs fuscous, with orange-yellow bands round the tarsi.

Type ♀ (28468) Mus. Wlsm.

HAB. MAUI: Haleakala, 4000 ft., V. 1896. Two specimens.

65. (2) *Agonismus coruscans*, sp. nov. (Pl. XV. fig. 16).

Antennae brownish fuscous, yellowish on the basal joint beneath. Palpi pale yellowish. Head shining, bronzy fuscous. Thorax bronzy brownish. Forewings bronzy brown, with a slight purplish gloss, sparsely sprinkled with shining golden scales, of which there is an outwardly angulated transverse band before the apex, followed by shining metallic cupreous and golden scales around the termen and apex and in the base of the purplish grey cilia. Exp. al. 9—10 mm. Hindwings dark purplish grey, with scarcely paler tawny grey cilia. Abdomen bronzy fuscous. Legs bronzy fuscous, with whitish ochreous spurs and tarsal spots.

Type ♂ (25745) Mus. Wlsm.

HAB. HAWAII: Kona, 4000 ft., 17—20. VII. 1892. Two specimens.

This species differs from *flavipalpis* in the much less purple forewings and in the less conspicuous concentration of the golden scales and the rather paler palpi.

66. (3) *Agonismus argentiferus*, sp. nov. (Pl. XV. fig. 17).

Antennae shining, bronzy. Palpi silvery white; terminal joint less than half the length of the median. Head and Thorax bronzy. Forewings shining, pale bronzy, an obscure whitish line from the base along the fold to about one-third; the apex of the wing shining silvery white, produced in a slender line along the base of the costal cilia; cilia bronzy at the apex, greyish at the dorsum. Exp. al. 9 mm. Hindwings and cilia brownish grey. Abdomen brownish grey. Legs bronzy grey, with white tarsal bands.

Type ♀ (27392) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VII. 1895. Two specimens.

18. ELACHISTA Tr.

ELACHISTA Tr., Schm. Eur. IX. (2) 177, No. 153 (1883), *Auct.*
Meyr., HB. Br. Lp. 640, 664, No. 7, fig. (1895): Pr. Linn. Soc. NSW. XXII. 299, 331—2, No. 13 (1897).

The geneonym "*Elachista*" Auct. is used incorrectly, but its present application is well-known, and at the present moment I am not disposed to revise all the geneonymy involved before a correction can be made.

67. (1) *Elachista spilota*, sp. nov. (Pl. XV. fig. 18).

Antennae pale brownish fuscous. Palpi white, the terminal joint speckled with fuscous beneath, the outer end of the median joint fuscous. Head and Thorax brownish fuscous. Forewings bronzy brownish fuscous, with silvery white spots; one square, resting on the middle of the fold, another, also square, on the dorsum at the end of the fold; between these a short outwardly oblique costal streak, a small costal spot between this and the apex and a larger spot at the apex; cilia brownish fuscous. Exp. al. 7 mm. Hindwings and cilia brownish fuscous. Abdomen fuscous. Legs pale cinereous.

Type ♂ (28405) Mus. Wlsm. [injured when being figured].

Hab. Maui: Haleakala, 5000 ft., v. 1896. Unique.

68. (2) *Elachista longisquamella*, sp. nov. (Pl. XV. fig. 19).

Antennae greyish fuscous. Palpi greyish fuscous, the median and apical joints tipped with white. Head and Thorax greyish fuscous. Forewings greyish fuscous, with a short straight white costal streak just beyond the middle, diffused outward at its lower extremity in a series of scattered white scales towards the dorsum; a few white scales about the end of the cell are equidistant between this streak and a white transverse band from costa to tornus consisting of very long narrow scales subequal in length to the width of the fascia; cilia greyish fuscous, paler on their outer half and about the tornus. Exp. al. 6 mm. Hindwings and cilia brownish grey. Abdomen fuscous above, whitish beneath; the sides of the anal tuft ochreous. Legs blackish, hind tarsi spotted with whitish.

Type ♀ (25357) Mus. Wlsm.

Hab. Hawaii: Kona, 4000 ft., ix. 1892. Two specimens.

19. Stagmatophora HS.

=*PYRODERCES* (Z., *MS.*) HS.; =*LABDIA* Wkr.; =*PROTEROCOSMA* Meyr.

Type 1. *Oecophora hydeniella* FR. (HS. 1853).

Stagmatophora HS., SB. Schm. Eur. v. 13, 49, No. 87; vi. Pl. XIII. 27—28, expl. p. vii (1853); Stgr-Wk., Cat. Lp. Eur. 321, No. 274 (1871); Hein-Wk., Schm. Deutsch. Tin. 425, No. 485 (1876); Meyr., Pr. Lin. Soc. NSW. xxii. 341 (1897); Stgr-Rbl., Cat. Lp. Pal. ii. 188, No. 405 (1901); Wlsm. & Drnt., Ent. Mo. Mag. xlii. 196—7 (1906).

Type 2. *Cosmopteryx argyrogrammos* Z. (HS. 1854).

PYRODERCES HS., SB. Schm. Eur. [v. 12, 47, No. 80: vi. Pl. XIII. 29—30, expl. p. vii (1853) *MN.*]: v. 212, No. 80 (1854); Stgr-Wk., Cat. Lp. Eur. 321, No. 275 (1871); Hein-Wk., Schm. Deutsch. Tin. 425, No. 486, Tab. Gatt. 9, No. 134 (1876); Meyr., Pr. Lin. Soc. NSW. xxii. 299, 341, No. 15 (1897); Stgr-Rbl., Cat. Lp. Pal. ii. 185, No. 391 (1901); Wlsm. & Drnt., Ent. Mo. Mag. xlii. 197 (1906).

Type 3. *Labdia deliciosella* Wkr. (Wkr. 1864).

LABDIA Wkr., Cat. Lp. B.M. xxix. 823 (1864); Meyr., Pr. Lin. Soc. NSW. xxii. 341 (1897); Wlsm. & Drnt., Ent. Mo. Mag. xlii. 197 (1906).

Type 4. *Proterocosma triplanetis* Meyr. (Wlsm. & Drnt. 1906).

PROTEROCOSMA Meyr., Tr. Ent. Soc. Lond. 1886, 293: Tr. N.Z. Inst. xxi. 174 (1889): Pr. Lin. Soc. NSW. xxii. 341 (1897); Wlsm. & Drnt., Ent. Mo. Mag. xlii. 197 (1906).

69. (1) *Stagmatophora* (*Proterocosma*) *incertulella*, Wkr. (Pl. XV. fig. 20).

Gelechia incertulella Wkr., Cat. Lp. B.M. xxix. 658—9 (1864).

Antennae pale fawn, with fuscous spots above. Palpi pale fawn-ochreous, with six blackish bands, three on the median joint and three on the terminal. Head and Thorax pale fawn. Forewings pale fawn, with a small blackish spot below the costa at one-sixth, a second, pale-margined, a little above the middle of the wing, a third at the end of the cell, pale-margined above and beneath by pale fawn-ochreous lines and preceded by a slight costal shade; two oblique pale lines arise from the dorsum, one in the middle, the other before the tornus, and a blackish ocelloid spot, margined with pale fawn-ochreous at the apex, is followed by a short streak in the pale fawn cilia which are also shaded with fuscous below it. Exp. al. 13 mm. Hindwings pale fawn-grey; cilia fawn-ochreous. Abdomen pale fawn. Legs pale fawn ochreous, the tibiae and tarsi obliquely banded with fuscous externally, as are also the sides of the abdomen beneath.

Type ♀ (unset) Mus. Br. [Caenotype ♀ (26577) Mus. Wlsm.]

HAB. HAWAIIA (SANDWICH IS.)[1]. MAUI: Haleakala, 5000 ft., III. 1894. One specimen (Perkins).

In the forewings veins 7 and 8 are stalked, 5 and 6 out of 7; 6 and 7 are stalked in the hindwings.

[The following species is so closely allied to *incertulella* that it seems advisable to insert the description although the insect has not yet been met with in Hawaiia.

69^{a}. (1^{a}) *Stagmatophora* (*Proterocosma*) *tridigitella*, sp. nov.

Antennae fawn-grey, slightly spotted with fuscous. Palpi fawn-whitish, with six blackish bands, three on the median and three on the terminal joint. Head and Thorax fawn-greyish. Forewings fawn-greyish, with two small fuscous dots at one-sixth from the base, one below the costa, the other below the fold, each succeeded by fawn-whitish scales; scarcely above the middle of the wing is an elongate blackish spot within the upper origin of a fawn-whitish sharply angulate sagittate streak, pointing outward to another elongate blackish spot at the end of the cell, also narrowly encircled by fawn-white, with two short parallel streaks of the same above and below it; the apex and cilia fawn-white, with three streaks running through them in the form of an inverted anchor, tornal cilia pale fawn-ochreous. Exp. al. 12—16 mm. Hindwings pale rosy grey; cilia pale fawn-ochreous. Abdomen pale fawn. Legs pale fawn, obliquely barred with fuscous.

Type ♀ (2859) *Rapa*, Mus. Wlsm.

HAB. S. PACIFIC—RAP-A (= OPARA) ID., "beaten from thatch," 18. IV. 1883 (J. J. Walker).—PITCAIRN ID., I. VI. 1883 (J. J. Walker).

Neuration as in *incertulella* Wkr.]

70. (2) *Stagmatophora honorariella*, sp. nov. (Pl. XV. fig. 21).

Antennae with the basal joint flattened, a little curved and slightly tufted; pale ochreous. Palpi whitish, with a slight ochreous tinge. Head white, with some slight ochreous scales above. Thorax white; ♂ with ochreous lateral expansible hair-pencil.

Forewings rather shining white, with three transverse pale brownish ochreous bands, narrowly margined with dark brown, the first near the base, the second about the middle, the third before the apex, the margins of the latter less pronounced; at the base of the brownish ochreous cilia are a few more brown scales crossing the apex; with a small tuft of erect scales on the underside at the end of the cell. Exp. al. 11 mm. Hindwings shining pale grey; cilia brownish ochreous. Abdomen ochre-brown, white at the sides and beneath. Legs shining white, with transverse brownish ochreous bands, the tarsal joints tinged with ochreous.

Type ♂ (2883) *Pitcairn Id.*, Mus. Wlsm.

HAB. HAWAIIA. [Without locality (Blackburn) Mus. Meyr.] S. PACIFIC. PITCAIRN ID., I. VI. 1883 (J. J. Walker). Two specimens.

Closely allied to *quadrifasciata*, but differing in the paler markings and in the absence of a pronounced subapical band. The presence of the small tuft of scales on the underside of the forewings in the ♂ at once distinguishes *honorariella* from *quadrifasciata*.

71. (3) *Stagmatophora quadrifasciata*, sp. nov. (Pl. XV. fig. 22).

Antennae simple, or slightly serrate towards apex, pale ochreous, the basal joint flattened, slightly tufted. Palpi slender, recurved, divergent, the terminal joint longer than the median, both smooth; pale ochreous. Head pale ochreous, the face whitish. Thorax pale ochreous. Forewings narrow, elongate, tapering to an acute apex; shining whitish, with four transverse bands, brownish in the middle, darkened with brownish fuscous scales along their margins; these scales are more or less diffused inward across the bands; the first band is near the base, the second before the middle, the third at three-fourths, and the last, inverted, from the costa at the apex to the tornus; with the exception of this last the bands are scarcely inverted and of even width throughout; a slender fuscous line curves around the apex in the pale ochreous cilia which are somewhat grey-shaded at the tornus and on the dorsum. Exp. al. 12 mm. Hindwings narrower than the forewings, acutely pointed; brownish grey, cilia concolorous. Abdomen brownish ochreous, with transverse silvery lines across the base; silvery whitish beneath and at the sides. Legs pale ochreous, with brownish shade-bands.

Type ♀ (71801) *New Guinea*, Mus. Wlsm.

HAB. HAWAIIA. [Without locality (Blackburn) Mus. Meyr.] S.E. NEW GUINEA: Dinner Id., in the mangrove swamps, VII. 1887 (Kowald). Two specimens.

72. (4) *Stagmatophora ? sordidella*, sp. nov. (Pl. XV. fig. 23).

Antennae biserrate in ♂; brownish cinereous. Palpi slightly recurved, divergent, median joint slightly longer than the terminal, scarcely more thickened, slender; brownish cinereous. Head and Thorax brownish cinereous. Forewings pale brownish cinereous with brownish fuscous spots and mottling, the latter especially pronounced in a costal patch at one-third, another at two-thirds, and in an ill-defined oblique ante-apical band ; the outer costal patch is produced obliquely downwards and merges in the dark speckling of the wing which separates it from a more distinct dark spot, a little above the dorsum, at two-thirds from the base ; this is preceded by others less conspicuous on either side of the fold, but with the exception of the apical fourth through which a dark diffused band passes, the whole wing is thickly speckled with brownish fuscous scales, the scales constituting the markings being generally slightly raised ; cilia speckled in the same way as the wings, conforming to the darker area on the dorsum they become brownish grey ; on the underside of the ♂ there is a small tuft of raised scales at the end of the cell. Exp. al. 9 mm. Hindwings brownish ; cilia brownish grey. Abdomen brownish fuscous. Legs brownish grey with paler spurs.

Type ♂ (26852) Mus. Wlsm.

HAB. KAUAI : Mts., 3000—4000 ft., VI. 1894. Two specimens.

The terminal joint of the palpi is shorter than usual in this genus, but the material before me does not enable me to refer the species elsewhere.

20. APHTHONETUS, gen. nov.

(ἀφθόνητος = unenvied.)

Type, *Aphthonetus diffusa* Wlsm.

Antennae, basal joint slightly enlarged, without pecten ; simple, biserrate towards apex. Maxillary Palpi short, appressed to the haustellum. Labial Palpi long, slender, recurved ; median joint more or less clothed with slender hair-scales ; terminal joint acute, of about equal length with the median. Haustellum scaled towards the base. Ocelli absent. Head and Thorax smooth ; face receding. Forewings elongate, lanceolate, costa arched and ciliate outward from one-third, apex obtusely pointed, flexus moderately pronounced ; surface with scattered groups of more or less raised scales : neuration 11 veins (4 and 5 probably coincident) ; 6 out of 7 close to apex, 7 and 8 stalked, 7 to costa ; media weak. Hindwings narrower than the forewings, lanceolate, flexus pronounced, costa slightly arched before middle ; cilia longer than the breadth of the wing : neuration 8 veins ; 6 and 7 stalked, enclosing apex ; 2, 3, and 4 remote, 5 midway between 4 and 6 + 7. Abdomen somewhat flattened, with naked patches on the basal segments. Legs, hind tibiae more or less hairy.

73. (1) *Aphthonetus mediocris*, sp. nov. (Pl. XV. fig. 24).

Antennae pale olivaceous, the underside of the basal joint pale ochreous. Palpi greenish ochreous, shaded with greyish fuscous. Head and Thorax olivaceous grey. Forewings pale greenish ochreous, sprinkled and shaded throughout with olivaceous grey, with a few darker greyish fuscous spots of raised scales distributed about the fold and discal cell ; of these the most noticeable are—one about the middle of the fold, with one on the cell a little beyond and above it, with which are a few dark ochreous scales; this is followed by two others in the same line with it on the cell, and half-way between them, on the extremity of the fold below, is a larger one touching the dorsum; there is an indication of similar darkish spots along the base of the costal and terminal cilia which are greenish grey. Exp. al. 15—18 mm. Hindwings pale slaty grey; cilia inclining to brownish ochreous. Abdomen with a leaden grey spot above at the base, the first three segments beyond it brownish, the posterior segments silvery grey; anal tuft inclining to ochreous. Legs pale ochreous, somewhat shaded with greyish fuscous on the tibiae and first tarsal joints; hind tibiae with pale ochreous hairs above.

Type ♂ (26619); ♀ (28235) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., III.—IV. 1894; V. 1896; Olinda (Haleakala), 4000 ft., IV. 1894. Twenty-three specimens.

This is a most difficult insect to describe; its general appearance is a pale yellowish green, with indistinct mottled shading, and small ill-defined raised spots, it has however no very characteristic markings, although certainly distinct from all other species known to me.

74. (2) *Aphthonetus fugitiva*, sp. nov. (Pl. XV. fig. 25).

Antennae stout, hoary greyish. Palpi pale hoary grey, dusted with fuscous. Head and Thorax hoary greyish. Forewings hoary greyish-white, spotted and dusted with olivaceous fuscous, some of the spots on the basal half having an admixture of ochreous scales with a tendency to be raised above the wing-surface; it is difficult to say that any spots are more distinct than others, but if such could be selected they would be two costal spots, one before and one beyond the middle (above and between which the cilia, which extend along the whole margin, are very pale ochreous) and another about the end of the fold—the whole wing has thus a mottled appearance without defined pattern; cilia hoary greyish, intermixed with brownish fuscous speckling. Exp. al. 14 mm. Hindwings and cilia shining, leaden greyish. Abdomen shining, pale greyish cinereous, the usual three smooth basal patches being brownish fuscous. Legs unicolorous, shining, pale cinereous.

Type ♂ (27857) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895. Three specimens.

The two paratypes are in inferior condition, exhibiting no ochreous scales among the darker mottling, but these may well be abraded.

75. (3) *Aphthonetus kauaiensis*, sp. nov. (Pl. XV. fig. 26).

Antennae cinereous. Palpi cinereous, dusted externally with fuscous. Head and Thorax cinereous, the latter somewhat dusted with fuscous. Forewings cinereous, dusted with fuscous scales, with a chestnut-brown shade at the base above the fold, abruptly terminated outward and constituting the inner edge, above the middle, of an oblique fascia of the pale ground-colour; the outer edge of this fascia commencing on the costa at one-third, is more or less clearly defined, obliquely to the dorsum, by a strong chestnut-brown shade, extending thence to the apex but mottled with pale cinereous; a few blackish scales arise below the fold on the outer edge of the pale fascia, and some others about the dorsum at the end of the fold; cilia brownish grey. Exp. al. 10—11 mm. Hindwings and cilia pale greyish. Abdomen dull ochreous towards the base, greyish beyond. Legs very pale ochreous, or cinereous.

Type ♂ (27534); ♀ (27997) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (5) V.—VI. 1894; Halemanu, 4000 ft., (17) V. 1895. Twenty-two specimens.

This species varies much in the contrast between the darker and paler portions of the wing. In some specimens the oblique cinereous fascia dividing the basal from the median portion is quite absent, while in others again the tendency of the shades, at least beyond where the fascia should be, is longitudinal; in intermediate forms the central portion is obscurely outlined and tends to assume the form of a large costal triangle reaching downward to the fold. The head, thorax and cilia are concolorous with the wing, the latter usually partaking of the pale stippling which characterises its lighter portions.

The forewings are somewhat narrower and more pointed than in the allied species *corticicolor* and *mediocris*.

76. (4) *Aphthonetus corticicolor*, sp. nov. (Pl. XV. fig. 27).

Antennae bronzy brownish. Palpi pale brownish cinereous, shaded with fuscous externally. Head and Thorax brownish fuscous. Forewings dull brownish ochreous, much suffused and mottled with tawny brown and fuscous, with tufts of raised scales; an outwardly oblique tawny brown basal patch is followed by a pale oblique fascia, almost entirely obliterated by fuscous scaling, this is followed by a wider oblique tawny brown band before the middle, diffused outwardly on its lower half and confluent with the regular brown and fuscous mottling which extends to the apex; cilia brownish cinereous, tawny fuscous on their basal half at the termen. Exp. al. 12—13 mm. Hindwings dark brownish grey; cilia brownish cinereous. Abdomen fuscous. Legs brownish cinereous, shaded externally with fuscous.

Type ♂ (26557) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., III.—IV. 1894. Five specimens.

77. (5) *Aphthonetus fluctuosa*, sp. nov. (Pl. XV. fig. 28).

Antennae and Palpi pale brownish cinereous, the latter with a fuscous ring around the apex of the terminal joint. Head and Thorax dark brown, the former somewhat speckled. Forewings dark brown, shaded with fuscous about the basal half of the fold, the brown ground-colour being mapped out in one or more bowed-out wavy shades by the intervention of pale brownish ochreous costal patches (one before, one at, and one beyond the middle) more or less diffused across the wing; this is especially noticeable in the third or outer patch, its semicircular extension preceding the dark brown apical region where some pale brownish cinereous mottling occurs, also around the margins and through the cilia; on the dorsum beyond the middle a pale patch is even more conspicuous than those on the costa. Exp. al. 13—15 mm. Hindwings greyish; cilia brownish grey. Abdomen and legs pale brownish cinereous.

Type ♂ (26758) Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., v. 1894; Halemanu, 4000 ft., v. 1895. Two specimens.

The distinction of this species from *corticicolor*, Wlsm., and others is sufficiently obvious when looking at them side by side, but the points of difference are exceedingly difficult to describe, among these the pale dorsal patch may be chiefly relied upon.

78. (6) *Aphthonetus passerella*, sp. nov. (Pl. XVI. fig. 1).

Antennae greyish fuscous. Palpi whitish cinereous, shaded with greyish fuscous externally. Head brownish cinereous. Thorax greyish fuscous, with some ferruginous and cinereous scales. Forewings brownish ferruginous, a greyish fuscous transverse band near the base, mixed with a few pale cinereous scales, divides the short ferruginous basal patch from a central ferruginous shade, both of which are much mixed with fuscous beyond the central shade; the ferruginous ground-colour is much mottled with pale cinereous and interspersed with fuscous streaks, a series of four dark fuscous terminal spots running through the greyish fuscous terminal cilia; costal cilia dark fuscous. Exp. al. 8 mm. Hindwings dark grey; cilia tawny grey. Abdomen greyish fuscous. Legs pale greyish.

Type ♂ (26742) Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., vi. 1894. Unique.

79. (7) *Aphthonetus divergens*, sp. nov. (Pl. XVI. fig. 2).

Antennae brownish cinereous. Palpi pale cinereous, dusted with fuscous externally. Head greyish fuscous; face very pale cinereous. Thorax brownish, tegulae tinged with ochreous. Forewings dull brownish, mottled with pale cinereous on the outer half and with a yellowish ochreous patch at the base, covering one-third of the width of the wing as far as the basal half of the costa, this contains some brown shading and blackish speckling, there is also a blackish shade beneath it along the upper edge of the cell blending with the brown ground-colour below it; the brownish grey cilia are slightly mottled at the apex in agreement with the mottled outer third of the wing. Exp. al. 12 mm. Hindwings and cilia greyish brown. Legs pale brownish cinereous.

Type ♂ (26183) Mus. Wlsm.

HAB. MOLOKAI: above 3000 ft., 30. V. 1893. Unique.

A single specimen nearly allied to *corticicolor*, Wlsm., and *fluctuosa*, Wlsm., but very distinct in its markings.

80. (8) *Aphthonetus bitincta*, sp. nov. (Pl. XVI. fig. 3).

Antennae greyish cinereous. Palpi pale cinereous, dusted with brownish fuscous externally. Head cinereous. Thorax brownish ochreous. Forewings whitish cinereous, mottled with brownish ochreous along the discal area nearly to the apex, the margins conspicuously spotted with dark brown scale-patches which are diffused through the basal half of the pale cinereous cilia; these patches, commencing at about one-third from the base, gradually diminish in size outwardly, the first dorsal being opposite to the first costal, but the second dorsal opposite to the third dorsal, the costal series consisting of about 7, the dorsal series of 4, not including one at the apex; there are some patches of raised scales towards the base, some in the brownish ochreous mottling, some in the upper edge of the first brown dorsal patch. Exp. al. 12—14 mm. Hindwings grey; cilia brownish grey. Abdomen greyish, with a brownish ochreous patch on three segments towards the base. Legs greyish, the tarsi inclining to ochreous.

Type ♂ (28484); ♀ (28282) Mus. Wlsm.

HAB. MAUI: Haleakala, below 4000—5000 ft., V. 1896; Olinda (Haleakala), 4000 ft., V. 1896. Eight specimens.

81. (9) *Aphthonetus columbella*, sp. nov. (Pl. XVI. fig. 4).

Antennae brownish grey, with a white spot at the end of the basal joint. Palpi whitish, sprinkled with brownish grey. Head and Thorax whitish, much suffused with pale greyish fuscous. Forewings white, sprinkled at the base, across the middle, and on the outer half of the costa with pale greyish fuscous, the outer edge of the basal patch being indicated by a broken oblique darker fuscous band overlapping the fold but not descending to the dorsum; on the median band are some broken dark fuscous blotches above and below the fold, and a dark fuscous blotch lies on the dorsum about the tornus, two small dark spots lying between it and the central band; the dark spots contain raised scales; cilia brownish grey, bestrewed around the apex with fuscous scales at their base. Exp. al. 13—15 mm. Hindwings and cilia brownish grey. Abdomen cinereous, tinged with ochreous towards the base. Legs pale cinereous.

Type ♀ (26102); ♂ (26162) Mus. Wlsm.

HAB. MOLOKAI: above 3000—4000 ft., 30. V.—9. VI. 1893, VI. 1896. Six specimens.

82. (10) *Aphthonetus lichenalis*, sp. nov. (Pl. XVI. fig. 5).

Antennae pale greyish brown, the basal joint white beneath. Palpi white, the median joint very hairy, both sprinkled and shaded externally with greyish brown. Head and Thorax stone-white. Forewings stone-white, sprinkled spotted and blotched with greyish brown mixed with fuscous containing raised scales; an ill-defined outwardly oblique basal patch reaches to about one-sixth from the base, and beyond it at about one-third is a darker costal patch, scarcely connected with another beyond the middle, and with an elongate oblique streak crossing the middle of the fold; another conspicuous patch is placed at the tornus, the whole apical portion of the wing, including the stone-white cilia, is thickly spotted with the same colour, two small spots appear on the outer half of the discal cell and a third scarcely beyond its outer extremity. Exp. al. 15 mm. Hindwings and cilia pale brownish cinereous. Abdomen stone-whitish, with a brownish ochreous patch above at the base. Legs pale stone-ochreous.

Type ♀ (26484) Mus. Wlsm.

Hab. Lanai: 2000 ft., vii. 1894. Two specimens.

83. (11) *Aphthonetus digressa*, sp. nov. (Pl. XVI. fig. 6).

Antennae yellowish white, the basal joint chalk-white. Palpi, Head and Thorax white. Forewings chalk-white, with a small broken oblique costal streak near the base extending to the fold, a few scales passing below it; at about one-third from the base commences a dark umber-brown mottled shade, almost obliterating the white ground-colour over the remainder of the wing-surface to the apex, in this shade are five or six minute dots of raised dark fuscous scales along the disc and fold; cilia white, with slight brownish shade-spots along their base and around the termen and apex, tornal cilia greyish. Exp. al. 13 mm. Hindwings grey; cilia pale brownish grey. Abdomen dark grey. Legs brownish grey, whitish at the tarsal joints.

Type ♂ (28425) Mus. Wlsm.

Hab. Maui: Haleakala, 5000 ft., v. 1896; Olinda (Haleakala) 4000 ft., v. 1896. Four specimens.

84. (12) *Aphthonetus eleuthera*, sp. nov. (Pl. XVI. fig. 7).

Antennae pale cinereous, faintly barred above with olive-brown. Palpi pale cinereous, the terminal joint touched with olive-brown beneath. Head hoary cinereous. Thorax olive-brown, sprinkled with brownish fuscous. Forewings pale cinereous, much spotted and shaded with olive-brown and brownish fuscous, especially beyond the basal fourth, of which the pale outer side is obliquely bounded by scale-tufts of the darker colour; the brownish fuscous is specially noticeable on the costa at the commencement of the shaded portion of the wing and in two or more tufts towards the dorsum, also around the apex and termen, where it is much broken up by the pale ground-colour; the cilia correspond with the adjacent ground-colour of the wing, but are speckled around the apex with brownish fuscous. Exp. al. 11 mm. Hindwings and cilia greyish brown. Abdomen pale cinereous, shaded with brownish fuscous. Legs much shaded with brownish fuscous, pale cinereous on the spurs and at the joints.

Type ♀ (27385) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VII. 1895; Hilo, 2000 ft., XII. 1895. Two specimens.

In the single ♀ from Hilo (28598) the dark shading is broken up into separate spots, those on the margins and apex tending to fuscous, those on the disc olive-brown. The whole specimen is distinctly paler, the ground-colour being hoary cinereous, but I can only regard it as a variety.

Allied to *digressa*, Wlsm., but smaller and much less distinctly marked.

85. (13) *Aphthonetus confusa*, sp. nov. (Pl. XVI. fig. 8).

Antennae brownish cinereous, the basal joint fuscous. Palpi cinereous, tinged with brownish fuscous externally, the median joint somewhat rough beneath toward the apex. Head cinereous; face shining, smooth, whitish. Thorax brownish cinereous. Forewings whitish cinereous, much mottled with brownish fuscous and patched with blackish scaling, with tufts of raised scales; a strong greenish yellow tinge at the base diffused and evanescent before the middle, a small brownish fuscous costal spot at one-third from the base is succeeded by a larger costal patch of the same beyond the middle, the apical and plical areas being mottled; the blackish scaling is distributed in a narrow line from the base along the upper edge of the cell and in a broader patch crossing the basal half of the fold and leading on to an elongate patch on the outer end of the cell; cilia pale cinereous obscurely mottled. Exp. al. 13 mm. Hindwings very pale grey; cilia pale cinereous. Abdomen brownish ochreous. Legs whitish cinereous.

Type ♂ (28555) Mus. Wlsm.

HAB. MAUI: Olinda (Haleakala), 4000 ft., V. 1896. Unique.

86. (14) *Aphthonetus spurcata*, sp. nov. (Pl. XVI. fig. 9).

Antennae brownish cinereous, the basal joint dark fuscous above. Palpi brownish cinereous, much sprinkled with fuscous. Head fuscous; face cinereous. Thorax fuscous, the tegulae tipped with whitish cinereous. Forewings whitish cinereous, profusely sprinkled and clouded with a mixture of brownish cinereous and fuscous scaling, the latter prevailing in obscure patches along the margins, the former about the discal and apical areas; a discal spot of raised pale cinereous and fuscous scales at about one-third from the base is almost confluent with a similar spot on the fold a little beyond and below it; cilia whitish cinereous, dusted with fuscous on their basal half, becoming pale brownish cinereous on their outer half. Exp. al. 15 mm. Hindwings pale greyish; cilia pale brownish cinereous. Abdomen pale greyish fuscous. Legs pale brownish cinereous, the tarsi with broad fuscous bands.

Type ♂ (28439) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., v. 1896. Unique.

87. (15) *Aphthonetus plumbifer*, sp. nov. (Pl. XVI. fig. 10).

Antennae ashy grey towards the base, fading to pale cinereous outwardly. Palpi ash-white, sprinkled with fuscous. Head and Thorax ash-white, thickly sprinkled with fuscous; the tegulae tipped with chestnut. Forewings dull stone-whitish, sprinkled with pale greyish fuscous scales, mottled with reddish brown and longitudinally streaked along the middle with short black broken lines; a narrow streak arising at the base of the costa runs outward along the disc, meeting an outwardly oblique costal streak of the same dark fuscous colour at about one-fifth from the base, this streak crosses the fold, not reaching the dorsum, its lower extremity consisting of raised scales; the two streaks are both accompanied by reddish brown shading, which is continued to the dorsum and freely scattered over the median and apical portions of the wing, and in a series of ill-defined costal blotches from middle to apex; the black streaklets, also broken and ill-defined, are chiefly about the middle third of the wing, a single one stretching forward from the outer end of the cell nearly to the termen; about the lower angle of the cell is a small rounded patch of dark leaden grey scales; cilia stone-whitish, speckled with reddish brown and fuscous. Exp. al. 15 mm. Hindwings very pale grey; cilia greyish, inclining to ochreous around the apex. Abdomen yellowish grey. Legs whitish ochreous.

Type ♂ (27039) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., VI. 1894. Unique.

88. (16) *Aphthonetus trichophora*, sp. nov. (Pl. XVI. fig. 11).

Antennae pale cinereous, with a slight ochreous tinge. Palpi pale cinereous, the median joint slightly tufted above at its apex. Head pale cinereous. Thorax brownish grey, sprinkled with pale cinereous. Forewings pale hoary cinereous, with greyish-brown sprinkling; this is noticeable at the base, where there are also two spots of slightly darker raised scales, one flexal, the other median; a costal shade, commencing at about one-fourth, extends nearly to the apex, but is broken by speckling of the pale ground-colour, especially on its outer half; along the middle of the fold is a fuscous streak commencing in a tuft of raised scales, scarcely separated from a similar smaller tuft above it, obscurely indicating the inner oblique edge of the more shaded portion of the wing; there are other small brownish-grey spots on the discal area, one before, another beyond and above the middle of the wing, a third at the lower angle of the cell, followed by a fourth beyond it, but these have all a tendency to be absorbed in dark sprinkling and are indicated chiefly by the raising of the scales and probably unrecognisable in worn specimens; the apex and termen are mottled with greyish brown, cilia pale brownish grey. Exp. al. 13 mm. Hindwings and cilia pale brownish grey. Abdomen cinereous, with brownish ochreous patches above towards the base. Legs very pale cinereous.

Type ♂ (26863) Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., vi. 1894. Unique.

Closely allied to *plumbifer*, but separable by its more hairy tibiae and the absence of the black and chestnut markings.

89. (17) *Aphthonetus veterella*, sp. nov. (Pl. XVI. fig. 12).

Antennae dark grey, the basal joint considerably widened with thick scales. Palpi hoary whitish, sprinkled with dark grey. Head hoary, with brownish grey sprinkling. Thorax dark brownish grey. Forewings hoary white, sprinkled and streaked with brownish grey and dark greyish fuscous, the latter concentrated in a broad diffused shade from the base along the fold nearly to its extremity, the whole costal and terminal portion of the wing being mottled with diffused scale-groups of the same colour; cilia brownish grey. Exp. al. 12 mm. Hindwings shining, pale grey; cilia pale brownish grey. Abdomen hoary greyish. Legs pale yellowish grey.

Type ♀ (27530) Mus. Wlsm.

Hab. Kauai: Halemanu, 4000 ft., v. 1895. Unique.

90. (18) *Aphthonetus polia*, sp. nov. (Pl. XVI. fig. 13).

Antennae pale cinereous, with a slight ochreous tinge, except on the basal joint. Palpi whitish, dusted along the sides with pale brownish cinereous. Head and Thorax brownish cinereous. Forewings whitish, profusely sprinkled throughout with pale brownish cinereous; cilia whitish, dusted with pale brownish cinereous, inclining to greyish about the tornus. Exp. al. 12 mm. Hindwings pale brownish grey; cilia brownish grey. Abdomen whitish cinereous, with a pale ochreous spot above near the base. Legs whitish, with a slight ochreous tinge.

Type ♂ (26876); ♀ (27991) Mus. Wlsm.

Hab. Kauai: Halemanu, 4000 ft., v. 1895; Mts., 3000—4000 ft., vi. 1894. Two specimens.

Were it not for the palpi this insect might easily be mistaken for a *Coleophora*.

91. (19) *Aphthonetus subocellata*, sp. nov. (Pl. XVI. fig. 14).

Antennae pale greyish cinereous. Palpi greyish cinereous, with darker greyish shading externally. Head and Thorax greyish cinereous; the face paler. Forewings ashy grey, with rather darker grey shading and mottling (containing slightly raised scales), more pronounced on the outer two-thirds than on the paler basal third of the wing, which is obliquely margined on the outer side by the more suffused shading; at about one-third from the base a ferruginous inwardly oblique patch rests on the fold and is followed by four small ferruginous spots, three in a line on the disc, the fourth below the middle one a little above the fold; these are faintly ocelloid, being margined by the pale ground-colour; the base of the pale ashy grey cilia is slightly mottled around the apex. Exp. al. 14—16 mm. Hindwings pale grey; cilia pale brownish grey. Abdomen greyish fuscous. Legs pale cinereous, with a slight ochreous tinge.

Type ♂ (28310) Mus. Wlsm.

Hab. Maui: Haleakala, 4000—5000 ft., v. 1896. Nine specimens.

92. (20) *Aphthonetus nemo*, sp. nov. (Pl. XVI. fig. 15).

Antennae pale cinereous. Palpi and Head whitish cinereous. Thorax pale cinereous, darker in the centre. Forewings whitish cinereous, with a basal patch dilated on the fold, russet-brown, shaded with fuscous on the costa and limbus; beyond this the ground-colour forms a pale oblique fascia, dilated inward on the dorsum, distinctly margined with fuscous scaling along its outer edge, which forms the boundary of a distinct russet-brown shade dilated outward to beyond the middle of the wing; in the pale apical third is some fuscous speckling, mixed with russet-brown, a spot at the end of the fold being more noticeable than others above it, a few fuscous scales lying around the margin at the base of the brownish grey cilia. Exp. al. 13 mm. Hindwings and cilia shining whitish grey. Abdomen cinereous, with ochreous basal patches. Hind legs very pale cinereous, without markings.

Type ♂ (28317) Mus. Wlsm.

Hab. Maui: Haleakala, 5000 ft., v. 1896. Unique.

The palpi of this species are smoother than those of *subocellata* Wlsm.; in its markings it is very distinct from all others and is one of the few which can be said to be easily recognisable.

93. (21) *Aphthonetus exsul*, sp. nov. (Pl. XVI. fig. 16).

Antennae pale cinereous, the basal joint olivaceous grey. Palpi pale cinereous, with a slight fuscous shade around the terminal joint near its apex. Head pale cinereous. Thorax olivaceous grey. Forewings olivaceous greyish, sprinkled with pale cinereous, the extreme base and outer two-thirds of the wing somewhat shaded with darker greyish fuscous in which a large costal triangle is faintly indicated, two spots of raised fuscous scales marking its inner margin, adjacent to the fold on either side; some fuscous scaling is also visible in the apical area and in the base of the cilia, this scaling is also raised at the outer end of the fold; cilia pale greyish cinereous. Exp. al. 13—14 mm. Hindwings and cilia pale greyish cinereous. Abdomen pale cinereous, basal segments ochreous above. Legs pale cinereous, without markings.

Type ♀ (27414) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, (1) VII. 1895; Kona, 4000—5000 ft., (4) 4—25. VII. 1892, above 6000 ft., (1) 30. VIII. 1892; Hualalai (Kona), 5000 ft., (1) 5. VIII. 1892, summit of crater, 8000 ft., (1) 15. VIII. 1892. Eight specimens.

Allied to *subocellata* Wlsm., and *suffusa* Wlsm., from both of which it can be separated by the absence of dark spots beyond the inner margin of the shaded portion of the wing.

In one specimen (25209) the central shading is less conspicuous, but its inner margin is clearly defined; the specimen is however somewhat worn.

94. (22) *Aphthonetus albocinerea*, sp. nov. (Pl. XVI. fig. 17).

Antennae whitish cinereous. Palpi whitish cinereous, dusted and tipped with brownish fuscous. Head and Thorax whitish cinereous, sprinkled with pale brownish fuscous. Forewings whitish cinereous, dusted with pale brownish fuscous, especially on the outer two-thirds of the costa and the basal half of the dorsum; at one-third from the base a few darker brownish scales fall into line with an oblique dark brownish fuscous streak lying across the middle of the fold; this is followed by a smaller dark spot resting on the fold and by a few scattered dark brownish scale-spots above and about the tornus; the darker spots contain raised scales; cilia whitish cinereous dusted with pale brownish fuscous toward the apex. Exp. al. 15—18 mm. Hindwings pale brownish grey; cilia with a slight ochreous tinge. Abdomen whitish ochreous, with brownish ochreous patches on the three anterior segments above. Legs whitish ochreous.

Type ♀ (27169) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895; Halemanu, 4000 ft., V. 1895; Mts., 3000—4000 ft., V.—VI. 1894. Thirty-one specimens.

95. (23) *Aphthonetus diffusa*, sp. nov. (Pl. XVI. fig. 18).

Antennae pale ochreous, the basal joint white. Palpi white, sprinkled externally with greyish fuscous. Head and face white. Thorax greyish fuscous; tegulae stone-white. Forewings stone-white, with groups of greyish fuscous scales distributed around the costa and termen, the remainder of the wing-surface faintly mottled with greyish brown, containing raised scales; the first costal patch is at about one-third from the base, the second a little beyond the middle, the series diminishing in size and distinctness to the apex, those along the termen resting on the base of the stone-white cilia, which are also slightly sprinkled with similar scales. Exp. al. 15—19 mm. Hindwings and cilia pale brownish cinereous. Abdomen whitish, pale brownish cinereous above on its basal half. Legs stone-whitish.

Type ♂ (26662) *Maui*, Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895; Halemanu, 4000 ft., V. 1895; Mts., 3000—4000 ft., V.—VI. 1894.—MAUI: Olinda (Haleakala), 4000 ft., (1) IV. 1894. Twenty-five specimens.

Closely allied to *albocinerea*, which differs from *diffusa* in the absence of the tuft of raised scales on the fold at the termination of the first costal patch.

96. (24) *Aphthonetus hirsuta*, sp. nov. (Pl. XVI. fig. 19).

Antennae cream-white. Palpi cream-white, the median joint hirsute above and beneath, the terminal joint of equal length, smooth, slender, erect. Head and Thorax cream-white. Forewings cream-white, with four more or less oblique spots of raised dark brown scales, three along the fold and one on the termen beyond it; there is a faint indication of a small costal spot at one-third in line with the second plical spot; cilia cream-white, sprinkled with brownish scales around their base. Exp. al. 18—20 mm. Hindwings pale shining greyish; cilia with a pale ochreous tinge. Abdomen and Legs cream-white.

Type ♀ (26729) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., V.—VI. 1894. Two specimens.

97. (25) *Aphthonetus humerella*, sp. nov. (Pl. XVI. fig. 20).

Antennae cinereous, the basal joint white, with greyish shading above. Palpi and Head white. Thorax white, shaded with grey. Forewings white, dusted with greyish fuscous and brownish ochreous scales; at the base of the costa is a narrow black streak, broken into three spots, running along the upper edge of the cell, joining at its outer end a greyish fuscous costal spot at about one-fifth from the base; beyond the middle a series of about five diffused brownish spots continues to the apex; below the outer half of the fold are two small diffused brownish spots, followed by a larger greyish fuscous spot at the tornus, beyond which brownish ochreous mottling reaches to the apex and partly over-spreads the greyish white cilia; some of the minute scale-speckles on the outer half of the wing are black. Exp. al. 16—17 mm. Hindwings very pale shining grey; cilia pale greyish cinereous. Abdomen greyish. Legs very pale ochreous.

Type ♀ (28237); ♂ (28344) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., V. 1896. Four specimens.

98. (26) *Aphthonetus puncticiliata*, sp. nov. (Pl. XVI. fig. 21).

Antennae brownish cinereous, basal joint greenish, with a black spot above. Palpi whitish, narrowly shaded with fuscous scales along their outer sides. Head greenish. Thorax greenish, with a black spot above. Forewings dirty whitish, thickly mottled with pale olive-green throughout, with a number of black spots scattered about their surface; one above the fold before its middle, almost touching a second on the fold beyond it; one dorsal near the outer end of the fold, and one between the last two just above the fold; one costal at one-fourth, reduplicated beneath, is followed by a smaller reduplicated spot on the cell below it, two other discal spots following in the same line with its lower half, the last at the extremity of the cell; the costal cilia extend in the direction of the base as far as the first costal spot, these and the terminal cilia are cream-whitish, with a series of black diffused spots along their basal half extending from the middle of the costa around the apex and termen, a conspicuous black upright tornal spot terminating the series. Exp. al. 13—16 mm. Hindwings and cilia brownish grey. Abdomen greenish, ochreous towards the base. Legs whitish ochreous, tibiae with a slight terminal hair-tuft.

Type ♂ (25746) Mus. Wlsm.

HAB. HAWAII: Kona, 4000—5000 ft., 30. VI.—4. VII. 1892, 10. VIII.—IX. 1892; Mt. Kilauea, VI.—VII. 1895. Eight specimens.

99. (27) *Aphthonetus aspersa*, Btl. (Pl. XVI. fig. 22).

Laverna aspersa Btl., Tr. Ent. Soc. Lond., 1882, 44, No. 18 (1882)[1].

Antennae with the basal joint white, the stem faintly tinged with brownish. Palpi chalky white, sparsely dusted externally with brownish scales. Head and Thorax white. Forewings chalky white (not yellowish nor greenish white), with pale chestnut-brown spots of which the more conspicuous are strongly raised and centred with dark fuscous scales; these conspicuous spots are, one about the middle of the fold, obliquely reduplicated above towards the base, one between this and the base, also plical, and one at the end of the fold; others less conspicuous, but partly raised, are scattered over the outer half of the wing to the apex, and on the costa are three oblique spots, one near the base joining the upper edge of the first plical, one before and one after the middle; cilia white, with about four spots along their base. Exp. al. 12 mm. Hindwings and cilia pale greyish brown. Abdomen white, the three basal patches brownish. Legs pale brownish cinereous.

Type ♀ (106: 82. 9) Mus. Br.

HAB. OAHU: Mts., near Honolulu (Blackburn)[1].

[Two worn specimens collected by Mr Perkins have the spots (such as remain) in precisely similar positions, their ground-colour is however less chalky white and they have apparently fewer chestnut raised scales and spots. HAB. OAHU: Waianae Mts., 2000 ft., IV. 1892 (25105); Kawailoa Gulch, IV. 1893 (25654).]

100. (28) *Aphthonetus elegans*, sp. nov. (Pl. XVI. fig. 23).

Antennae pale brownish ochreous, the basal joint pale grass-greenish. Palpi cream-whitish, the median joint with a short fuscous streak externally at the base, the terminal joint externally pale green, speckled with light brown scales. Head pale green; face cream-white. Thorax pale greenish. Forewings pale grass-green, mottled with cream-white on which are set several patches of light brown scales (some raised), four of these on the discal area, three along the fold, and the remainder distributed around along the costa and dorsum, beyond the middle more or less scattered through the cream-white cilia; an elongate patch of rather darker brown scales occurs at the upper edge of the cell about one-fourth from the base. Exp. al. 18 mm. Hindwings shining, pale grey; cilia pale greyish cinereous. Abdomen brownish ochreous at the base, pale cinereous beyond. Legs whitish, the hairy clothing of the tibiae having a slight ochreous tinge; the anterior legs are streaked and banded with fuscous.

Type ♂ (28554) Mus. Wlsm.

HAB. MAUI: Haleakala, 4000 ft., V. 1896; Olinda (Haleakala), 4000 ft., V. 1896. Three specimens.

101. (29) *Aphthonetus sagittata*, sp. nov. (Pl. XVI. fig. 24).

Antennae pale greyish ochreous, the basal joint cream-colour. Palpi light bluish green, with a slender black streak externally on the basal half of the median joint. Head and Thorax cream-colour; the tegulae streaked with green. Forewings light bluish green, with cream-coloured spots and black arrow-shaped spots, containing some raised scales; the black spots are distributed as follows: a small one at the extreme base of the costa, another at the base of the dorsum, the former followed by three costal spots (the first almost contiguous to it, the second at about one-third, the third at a little beyond the middle), with a black length-streak on the cell below it; a series of three on the fold, all formed as arrow-heads pointing outwards (the first at one-third the length of the fold, the second about its middle, the third on the dorsum at its extremity), a reduplicated spot or biangulated streak rests on the termen, reaching nearly to the apex; the pale cream-coloured spots are distributed in connection with the black spots, for the most part on their anterior margins, being slightly raised, in connection with the plical spots; there are also two or three very small ones on the costa before the apex; cilia green about the apex, becoming greyish toward the tornus. Exp. al. 14—16 mm. Hindwings grey; cilia with a greyish ochreous tinge. Abdomen greenish grey, anal tuft ochreous. Hind legs pale ochreous; anterior and middle legs with green tufts on the tibiae, with a black ring around the first tarsal joint, the anterior femora black beneath.

Type ♂ (26820); ♀ (27173) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895; Mts., 3000—4000 ft., V.—VI. 1894. Sixteen specimens.

21. RHINOMACTRUM, gen. nov.

(ῥινόμακτρον = a handkerchief.)

Type *Rhinomactrum rutilellum* Wlsm.

Antennae as long as the forewings. Maxillary Palpi small, dependent. Labial Palpi divergent, inclining upward, median joint with expanding scales above and beneath towards its apex; terminal joint slender, naked, shorter than the median. Haustellum well-developed. Head and Thorax smooth. Forewings elongate, of even width throughout as far as the tornus, costa almost straight, apex scarcely depressed, termen oblique, surface with a few slightly raised scales: neuration 11 veins (4 and 5 probably coincident); 6 out of 7, 7 and 8 stalked, 7 to apex. Hindwings narrower than the forewings, elongate, lanceolate, pointed, cilia $2\frac{1}{2}$: neuration 8 veins, all separate; 6 and 7 approximating towards base. Abdomen moderate. Legs, hind tibiae with a few slight hairs.

Intermediate between *Neelysia* and *Aphthonetus*.

102. (1) *Rhinomactrum rutilellum*, sp. nov. (Pl. XVI. fig. 25).

Antennae whitish cinereous, with black annulations, the basal joint tawny reddish. Palpi, Head and Thorax tawny reddish, sprinkled with pale cinereous. Forewings tawny red, minutely sprinkled with pale cinereous and irrorated with minute black streaklets, some of which combine to indicate the margins of three ill-defined dull cinereous equidistant spots; one about the middle of the wing, with one before it and another at the end of the cell; on the costa at one-third is a small black streak preceded by another, placed parallel with the costa, and nearly reaching its lower extremity—the black streaklets are evenly distributed about the wing-surface; cilia concolorous, but tending to grey along the dorsum. Exp. al. 13 mm. Hindwings and cilia brownish grey. Abdomen and Legs leaden grey.

Type ♂ (26773) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., v. 1894. Unique.

103. (2) *Rhinomactrum? scapulellum*, sp. nov. (Pl. XVI. fig. 26).

Antennae dark fuscous. Palpi and Head whitish ochreous. Thorax dark brownish fuscous. Forewings whitish ochreous, with a short straight dark brownish fuscous basal patch followed by two brownish fuscous costal shades, one before, the other larger, beyond the middle; between and below these is a discal spot of the same colour, followed by a smaller one at the end of the cell; a brownish fuscous shade-patch at the apex partially overflows the costal cilia, terminal cilia whitish ochreous. Exp. al. 9 mm. Hindwings and cilia pale grey. Abdomen darker grey. Legs pale greyish, the tarsal joints banded above with greyish fuscous.

Type ♀ (28061) Mus. Wlsm.

HAB. HAWAII: Olaa, IX. 1896. Unique.

The single specimen is badly set, and the neuration difficult to determine with certainty; it appears to agree with that of *rutilellum*, but the median joint of the palpi is not clothed. The reception of the ♂ will probably justify the description of a new genus for this species.

22. NEELYSIA, gen. nov.

(*νέος* = new; Ἠλύσια = Elysian.)

Type. *Neelysia lignicolor* Wlsm.

Antennae shorter than the forewings, serrate, basal joint without pecten. Maxillary Palpi very short. Labial Palpi long, slender, recurved, divergent; median joint smooth, terminal joint acute, both joints of about equal length. Haustellum scaled towards base. Ocelli absent. Head and Thorax smooth; face receding. Forewings elongate, lanceolate, apex scarcely depressed, obtusely pointed, termen oblique, tornus obsolete, flexus rounded; without tufts of raised scales: neuration 11 veins (4 and 5 probably coincident); 7 and 8 stalked, 7 to costa; 6 separate; media weak. Hindwings narrower than the forewings, elongate, lanceolate, apex obtusely rounded; ♂ without subcostal hair-pencil; cilia 2: neuration 8 veins, all separate; 6 and 7 approximating towards base; 3 approximated to 2; 5 approximated to 6. Abdomen moderate. Legs, hind tibiae loosely haired.

The species are generally variable, the ♂ in some species with expansible lateral thoracic hair-pencil. *Neelysia* is probably derived from *Hyposmocoma*, through *Dysphoria* (or an ally), having veins 4 and 5 of the forewings stalked. The loss of a vein in *Neelysia* and *Aphthonetus* is thus indicated as caused by coincidence of these veins. *Aphthonetus* differs in emitting 6 of the forewings from 7, in having 6 and 7 of the hindwings stalked, in the clothing of the median joint of the palpi and the scale-tufts on the wing-surface.

104. (1) *Neelysia cuprea*, sp. nov. (Pl. XVI. fig. 27).

Antennae fuscous. Palpi yellowish ochreous. Head and face yellowish ochreous. Thorax cupreous, with some yellowish scales on the tegulae. Forewings cupreous, with a distinct yellowish ochreous spot on the cell at one-third from the base, obliquely placed, its lower extremity attenuated outwards to the fold; a smaller yellowish ochreous spot lies at the end of the cell with a few scales of the same colour on the costa above and beyond it (in fine specimens a series of minute semi-connected yellowish ochreous dots are visible at the base of the cilia around the apex); cilia brownish cinereous, shaded along their basal half with cupreous. Exp. al. 12—13 mm. Hindwings shining, very pale grey; cilia pale brownish cinereous. Abdomen brownish cinereous. Legs pale yellowish cinereous.

Type ♂ (27051); ♀ (27287) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (4) IV. 1895; Mts., 3000—4000 ft., (3) VI. 1894. Seven specimens.

105. (2) *Neelysia tigrina*, Btl. (Pl. XVI. fig. 28).

Chrysoclista tigrina Btl., Ann. & Mag. NH. (5. s.) VII. 406—7, No. 50 (1881)[1].

Antennae brownish grey. Palpi white, with a brownish grey streak along the under side of the median joint. Head straw-white, or ochreous. Thorax straw-whitish, tegulae brown. Forewings bright ochreous, with a straw-white streak from the middle of the base along the lower edge of the cell and along the fold nearly to its outer extremity (this white streak is absent in some varieties); beneath it is a short dark brown basal streak, below the fold, but not touching the dorsum, while above it is a longer dark brown streak commencing at the base of the costa and extended along the upper edge of the cell nearly to the middle of the wing, where after two short inverted dentate interruptions from the white streak below it, it is continued in the form of a blackish elongate dash extending to the end of the cell, with a few blackish scales surrounding a third interruption at the end of the cell; in varieties in which the white streak is replaced by the bright ochreous ground-colour, the two interruptions of the dark costo-basal streak coalesce and isolate the outer portion, and the blackish scales surrounding the third interruption sometimes extend to the costa, forming an outwardly oblique quadrangular patch; the apex of the wing is beautifully marked by a blackish, acutely angled streak, clearly defined on its inner edge, and preceded at its upper extremity by a narrow oblique whitish costal streak; this blackish marginal streak sends out short tooth-like projections into the costal, apical and terminal cilia, with small whitish dots between them at the base of the cilia which are bright ochreous beyond them, tornal cilia brownish grey; in some varieties the bright ochreous ground-colour suffuses the white costal streak and encroaches on the black apical streak, breaking it up into spots and exceptionally almost entirely obliterating it. Exp. al. 12—14 mm. Hindwings and cilia brownish grey. Abdomen dark tawny brownish. Legs brownish grey, with whitish spurs and tarsal annulations.

Type ♂ (120: 81. 7) Mus. Br. [Caenotypes ♀ (26702); ♂ (28497); ♂ (28346) Mus. Wlsm.].

HAB. MAUI: Haleakala (Blackburn)[1], below 4000—5000 ft., IV.—V. 1896 (Perkins); Olinda (Haleakala), 4000 ft., IV. 1894, V. 1896 (Perkins). Fourteen specimens.

A variable species, but easily separable from any yet described.

106. (3) *Neelysia lignicolor*, sp. nov. (Pl. XVII. fig. 1).

Antennae dark greyish brown. Palpi whitish ochreous, the terminal joint much shaded with greyish brown. Head whitish ochreous. Thorax greyish brown, with a dash of bone-whitish down the middle. Forewings with the costal third pale greyish brown, the dorsal two-thirds whitish ochreous, fading to bone-whitish, but sometimes shaded with greyish brown along the fold; an elongate brownish fuscous patch, on the cell about the middle, is followed by a roundish spot of the same colour at the end of the cell above which is a slight costal shade with an opposite elongate dorsal shade beneath it, the pale dorsal ground-colour extends here to the costa cutting off the apical portion of the wing which is much shaded with brownish fuscous; cilia around the apex rather light ochreous at their base, streaked with brownish fuscous on the costa and blending to greyish brown outwardly around the termen and tornus. Exp. al. 14—16 mm. Hindwings grey; cilia with a tawny brownish tinge. Abdomen dark tawny brownish. Legs tawny brownish, the tarsal joints and spurs bone-whitish.

Type ♂ (26534); ♀ (26536) Mus. Wlsm.

HAB. MAUI: Haleakala, above 5000 ft., (4) III. 1894, 5000 ft., (11) III. 1894, (7) IV. 1894, (22) V. 1896, 4000 ft., (1) V. 1896; Olinda (Haleakala), 4000 ft., (1) IV. 1894. Forty-six specimens.

This species varies considerably, the margins of the different shades of colour being nowhere clearly defined and blending imperceptibly into each other. In some varieties the whitish ochreous dorsal shade obliterates the apical markings, becoming more or less suffused with ochreous towards the apex. The dark shading in the fold is strong in some specimens and almost absent in others, but the discal spots are always distinct.

107. (4) *Neelysia fuscodentata*, sp. nov. (Pl. XVII. fig. 2).

Antennae whitish ochreous, shaded above with fuscous scales. Palpi stone-ochreous; the terminal joint as long as the median, slightly sprinkled with fuscous. Head whitish ochreous. Thorax brownish fuscous. Forewings evenly lanceolate, whitish ochreous, streaked and shaded with brownish fuscous; the dark shading extends along the costa from base to apex, but is very narrow before and about the middle of the wing; it overflows the whole of the base, but is more conspicuously condensed on the costa, along the fold and on the base of the dorsum; in the fold it extends nearly to the tornus almost obliterating a rather darker spot of the same colour about the middle of the fold; above and a little beyond this is a more or less conspicuous dark discal spot connected with another at the end of the cell by more or less continuous dark shading; above the outer end of the cell the brownish fuscous suffusion extends to the costa and apex, and narrowly around the termen; cilia brownish grey, with minute subochreous points along their base (these are the only indication of the pale streaks which in many species of this genus run through the terminal and costal cilia). Exp. al. 14 mm. Hindwings pale brownish grey; cilia slightly darker. Abdomen brownish grey, paler beneath. Legs whitish ochreous.

Type ♀ (27500) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VII. 1895. Two specimens.

Closely allied to *lignicolor* Wlsm., but apparently distinct, presenting a uniform pattern in the two specimens which is not to be found in the very variable series from Maui.

108. (5) *Neelysia cleodorella*, sp. nov. (Pl. XVII. fig. 3).

Antennae whitish, faintly annulate with pale tawny. Palpi white, with a slender tawny line along their under side; terminal joint longer than median. Head white. Thorax bone-white, with a tawny spot above. Forewings bone-white, the costal third shaded with tawny brownish as far as the end of the cell; in this costal shade are two white, inverted, dentate incisions, tending to unite and surround a spot of the darker colour at about the middle, with another white incision at its outer end leaving its apex obliquely terminated in a sharp point below the costa, and abruptly terminated in a second darker brownish projection on the end of the cell; a dark tawny brown line lies in the fold on its outer half, followed by some diffuse shading of a paler tint which is also visible along the dorsum; around the apex a dark tawny brown patch covers the costal and terminal margins, sharply angulated at its inner edge by the pale ground-colour and containing six or seven bone-white streaklets, three or four costal and three terminal, at the base of the tawny grey cilia. Exp. al. 12—14 mm. Hindwings grey; cilia tawny grey. Abdomen dark grey. Legs whitish, much shaded with tawny grey, and banded with the same across the tarsi.

Type ♂ (25251); ♀ (25246) Mus. Wlsm.

HAB. HAWAII: Kona, 4000 ft., (10) VII., 13. VIII., 8. IX. 1892; Mt. Kilauea, (2) VII. 1895. Twelve specimens.

109. (6) *Neelysia anthinella*, sp. nov. (Pl. XVII. fig. 4).

Antennae whitish, barred above with glaucous; basal joint streaked with greyish fuscous above and beneath. Palpi white, streaked with greyish fuscous from base to apex, on the median joint widely, on the terminal joint narrowly beneath. Head and Thorax white. Forewings white, with an ochreous tinge on the terminal area, a pale greyish fuscous streak extends from the base along the costa, depressed and attenuated nearly to the apex, its lower edge indented backward, but confluent with an elongate triangular dark fuscous dash occupying the end of the cell, below which is a narrower dash of the same colour along the upper edge of the fold; a white streak from the costa, very oblique (more so than in *Neelysia repandella*), forms an angle towards the apex at its meeting with the pale median space, the outer edge of which reverts to the tornus; beyond this the apex of the wing is dark fuscous, with three inverted white tooth-like streaklets running through the costal cilia, two or three others being faintly indicated in the ochreous dorsal cilia, tornal cilia pale greyish fuscous. Exp. al. 10—12 mm. Hindwings and cilia glaucous. Abdomen greyish fuscous, anal tuft whitish. Legs whitish.

Type ♂ (26425); ♀ (26455) Mus. Wlsm.

HAB. LANAI: 2000 ft., (3) II. 1894, (2) VII. 1894. Five specimens.

110. (7) *Neelysia repandella*, sp. nov. (Pl. XVII. fig. 5).

Antennae brownish fuscous. Palpi white, shaded externally on the median joint with brownish fuscous, which is continued in a slender line along the under side of the terminal joint to its apex. Head and Thorax snow-white; tegulae dark brown. Forewings dark brown, with a broad snow-white streak from the middle of the base, extending a little over the fold and blending at its outer end with a light brownish ochreous wash which nearly reaches the termen and is repeated on the cilia below the apex; from the upper edge of the white median streak three or four small barb-like projections are directed backward; at the commencement of the costal cilia an outwardly oblique streak meets the outer end of the pale median space and reverts at an angle to the tornus; in the dark brown space beyond it are three white streaks through the brown costal cilia and three below them through the ochreous terminal cilia. Exp. al. 9.5—10 mm. Hindwings grey; cilia with an ochreous tinge towards the apex. Abdomen shining grey. Legs greyish, with paler spots at the tarsal joints.

Type ♀ (26149); ♂ (26150) Mus. Wlsm.

Hab. Molokai: about 3000—above 4000 ft., (3) 22. v.—vi. 1893, (1) 19. ix. 1893. Four specimens.

111. (8) *Neelysia psaroderma*, sp. nov. (Pl. XVII. fig. 6).

Antennae black. Palpi, median joint black, with a white spot at the apex; terminal joint white, with a few black scales beneath near the apex. Head white above, face blackish. Thorax white, tegulae black. Forewings chalk-white, mottled with black, a black shade from the base along the costa reaches to the costal cilia, its outer half dilated downward, in a broad rather quadrangular patch, to the lower edge of the cell, and beyond the cell partially intermixed with the white ground-colour; a black dorsal shade from the base, also mottled, reaches nearly to the middle, a few spots at its outer end thrown up towards the fold; the apical portion of the wing, including the cilia, black, with three slender inverted white costal streaks and three opposite dorsal ones; the inner edge of this apical shade is indented by a well-defined rectangle of the white ground-colour piercing its middle. Exp. al. 10 mm. Hindwings and cilia pale greyish. Abdomen [missing]. Legs straw-white, tarsi faintly spotted.

Type ♂ (25101) Mus. Wlsm.

Hab. Oahu: Waianae Mts., 3000 ft., iv. 1892. Unique.

It is nearly allied to *repandella* and *anthinella*, but differs notably in the downward extension of the outer half of the dark costal shade forming a broad half-fascia quite inconsistent with the pattern of those species.

112. (9) *Neelysia municeps*, sp. nov. (Pl. XVII. fig. 7).

Antennae whitish ochreous, very faintly annulate with brownish. Palpi, median joint greyish fuscous, whitish ochreous at its apex and along its upper side; terminal joint as long as the median, whitish ochreous, with a slender greyish fuscous line along its under side. Head and Thorax whitish ochreous. Forewings whitish ochreous at the middle of the base, shading to fawn-brown along the dorsum and with a dark brownish fuscous shade commencing at the base and overflowing the costal margin as far as the end of the cell where there is a small arrow-like spot of blackish scales, margined with whitish ochreous, which extends backward along the cell, sending out two short oblique whitish ochreous points upward and backward into the dark costal shade; beyond the end of the cell is a reduplicated blackish line running half-way to the apex, and beneath it are two or three similar lines following the veins, the last of which is longer than the others and lies in the fold; a slender acutely angled whitish ochreous line, leaving the costa at the commencement of the costal cilia, runs nearly to the termen, reverting to the tornus and forming with the dark double line from the cell the figure of an arrow-head; before and behind this the colour of the wing is decidedly fawn-brown, and in the cilia beyond it are six inverted shining whitish cuneiform streaks, three above and three below the apex; cilia brownish grey, tinged with fawn-brown. Exp. al. 14—16 mm. Hindwings and cilia grey. Abdomen greyish. Legs greyish, the tarsi faintly spotted with whitish.

Type ♀ (26652) *Maui*, Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (1) IV. 1895; Mts., 3000—4000 ft., (1) V. 1894.—MAUI: Olinda (Haleakala), 4000 ft., (2) IV. 1894. Four specimens.

More nearly allied to *paltodorella* than to *agnetella*, differing from both in the darker palpi and paler antennae as well as in the dark costal and pale dorso-apical areas of the forewings.

113. (10) *Neelysia paltodorella*, sp. nov. (Pl. XVII. fig. 8).

Antennae bronzy fuscous above, paler beneath. Palpi whitish ochreous, a slender fuscous line along the under side throughout. Head and face bronzy greyish fuscous, a fawn-brown lateral streak above each eye. Thorax brownish fuscous, the tegulae edged with dark fawn-brown. Forewings dark fawn-brownish, shaded with brownish fuscous, a dark fuscous line running along the fold throughout; a dark fuscous shade, commencing about the middle of the cell, is broken into three portions by two pale fawn-ochreous rings encircling the inner and outer thirds of it and forming two oblique elongate suboval spots with a dark space between them; at the commencement of the costal cilia an outwardly oblique whitish ochreous costal streak is attenuated to a point opposite to the middle of the termen where it meets, or nearly meets, a similar streak arising a little beyond it on the dorsum; beyond these streaks are four costal and three or four terminal short whitish ochreous streaks running through the fuscous cilia. Exp. al. 11—15 mm. Hindwings shining, grey; cilia brownish cinereous. Abdomen dark brownish grey. Legs brownish grey, the spurs and joints whitish ochreous.

Type ♀ (26910); ♂ (27060) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (12) V.—VI. 1894; Kaholuamano, 4000 ft., (10) IV. 1895. Twenty-two specimens.

The Kaholuamano specimens have the head, thorax and forewings much suffused with pale fawn-ochreous and the darker markings are broken up. The same form however occurs among the other series and I can only regard it as a variety.

114. (11) *Neelysia fuscofusa*, sp. nov. (Pl. XVII. fig. 9).

Antennae fuscous, with obscure paler bars. Palpi brownish ochreous, more or less shaded externally with fuscous. Head and Thorax varying from brownish ochreous to dark brown; face paler. Forewings dull brownish ochreous, almost entirely suffused with dark fuscous, in some specimens obliterating the always ill-defined markings which consist of the usual two elongate blackish discal spots, the first of which is produced outwardly along the cell and sometimes divided into two parts; another elongate spot is traceable in the fold below and before the first discal; around the apex are very faint ochreous spots at the base of the dark fuscous cilia, but much less clearly indicated than in the two nearly allied species *paltodorella* Wlsm., and *agnetella* Wlsm. Exp. al. 13—14 mm. Hindwings and cilia dark brownish grey. Abdomen brownish fuscous. Legs brownish, with pale tarsal and tibial spots.

Type ♂ (27099); ♀ (27053) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (9) IV. 1895; Mts., 3000—4000 ft., (3) VI. 1894. Twelve specimens.

In its blurred and sometimes almost entirely obliterated markings and less conspicuous terminal and cilial spots it differs from the other two species mentioned above, but is obviously very nearly allied to *agnetella* which varies somewhat in the same direction. I cannot however regard it as belonging to that species.

115. (12) *Neelysia agnetella*, sp. nov. (Pl. XVII. fig. 10).

Antennae dark fawn-brown. Palpi pale ochreous, shaded with fawn-brown externally. Head pale ochreous, mixed with fawn-brown. Thorax fawn-brown, tegulae touched with pale ochreous. Forewings dark fawn-brown, with a pale ochreous streak running from the middle of the base to the lower half of the termen and dilated to a little below the fold in which it leaves a brownish fuscous central streak, some fawn-brown scales before and behind it; immediately above the plical streak is an oblique brownish fuscous discal spot, encircled narrowly by pale ochreous, whence a dark streak along the cell reaches to a similar oblique ocelloid spot at the end of the cell; above and beyond this is a pale ochreous costal spot whence a dark fawn-brown band runs around the apex and termen, sharply angulated opposite to the apex, embracing the base of the cilia in which are a series of wedge-shaped pale ochreous spots, pointing inward, to the number of four above and four or five below the apex. Exp. al. 11—14 mm. Hindwings grey; cilia brownish grey. Abdomen greyish fuscous. Legs pale cinereous.

Type ♂ (26664); ♀ (26677) Mus. Wlsm.

HAB. MAUI: Haleakala, 4000—above 5000 ft., III.—IV. 1894, V. 1896; Olinda (Haleakala), 4000 ft., IV. 1894, V. 1896. Seventeen specimens.

In some varieties the paler colours are wanting, the wings being entirely suffused with dark purplish fuscous, the central and plical spots being very indistinct, but obscurely surrounded by slightly paler colour. In other varieties the fawn-brown colour assumes a paler shade, obliterating the pale ochreous median streak and more or less suffusing the other paler markings, leaving the darker ones distinctly indicated.

116. (13) *Neelysia rotifer*, sp. nov. (Pl. XVII. fig. 11).

Antennae white, with a black streak above from the base, breaking into spots on the outer half. Palpi long, slender, terminal joint as long as the median; white, with a black line along the under side of the terminal joint. Head greyish brown; face white. Thorax light buff-brown. Forewings light buff-brown, a short oblique white streak on the cell at about one-third from the base is followed by a longer oblique white streak, also commencing below the costa, its lower extremity enclosing an elongate oblique black spot about the end of the cell; this is followed by a large cone-shaped silvery white patch resting on the tornus, its apex reaching outward to the middle of the termen, a slender oblique white costal streak from the commencement of the costal cilia running into its upper side; beyond this seven or eight short white streaks radiate outward through the cilia, the two or three lower ones almost touching the tornal patch, the apical ones separated by black terminal dots; a slender white streak along the outer half of the fold is narrowly margined on either side by black scales; cilia pale brownish, fading to whitish cinereous about the tornus. Exp. al. 10 mm. Hindwings pale grey; cilia pale brownish cinereous. Abdomen greyish. Legs whitish, with greyish transverse bands.

Type ♂ (26317) Mus. Wlsm.

HAB. MOLOKAI: 3000 ft., 6. IX. 1893. Unique.

117. (14) *Neelysia basivittata*, sp. nov. (Pl. XVII. fig. 12).

Antennae greyish cinereous. Palpi greyish, a white line along the upper side of the terminal joint, the inner side of the median joint also white. Head and Thorax fuscous. Forewings fuscous, with a conspicuous white streak from the base along the fold nearly to its middle; beyond it are three oblique white transverse streaks on the cell, the outer one forming the inner margin of an elongate blackish spot at the end of the cell, beyond which again are two oblique cuneiform marginal spots, one costal, the other tornal, followed by three costal and two dorsal white streaklets in the greyish fuscous cilia. Exp. al. 12—14 mm. Hindwings and cilia greyish fuscous. Abdomen slender, dark fuscous. Legs pale greyish fuscous, with whitish spots at the joints.

Type ♂ (28285); ♀ (28434) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., (3) v. 1896; Olinda (Haleakala), 4000 ft., (1) v. 1896. Four specimens.

118. (15) *Neelysia pluviella*, sp. nov. (Pl. XVII. fig. 13).

Antennae dark brownish fuscous, an ochreous streak along the basal joint. Palpi with the median joint greyish fuscous, tipped with whitish grey on its inner side; terminal joint whitish, with a dark line beneath. Head ochreous, shaded with fuscous above, face fuscous. Thorax bright ochreous, tegulae with a fuscous patch. Forewings dark brownish fuscous, shading to blackish, with white streaklets; the first enclosing, except at its lower edge, a large reniform spot of the dark ground-colour about the middle of the cell, the second completely enclosing a smaller spot at its outer end; above and beyond the latter is an outwardly oblique white costal streak, a less conspicuous dorsal streak a little beyond it, in the cilia are four or five dorsal and three costal white streaks; cilia with an ochreous tinge on the termen, blackish at the apex, paler brownish fuscous along the dorsum. Exp. al. 12 mm. Hindwings and cilia brownish grey. Abdomen fuscous. Legs with the hind tibiae whitish ochreous, spurs white, tarsi fuscous with five white spots.

Type ♀ (26236) Mus. Wlsm.

HAB. MOLOKAI: about 4000 ft., 22. V.—VI. 1893. Two specimens.

This species differs from *ningorifera* Wlsm., in its darker palpi and in its ochreous thorax, and from *petalifera* Wlsm., in the absence of the basal streak as well as in the colour of the head, thorax and palpi.

119. (16) *Neelysia ningorifera*, sp. nov. (Pl. XVII. fig. 14).

Antennae black. Palpi pale ochreous; the terminal joint with a line of black scales beneath. Head and face ochreous, black at the sides and sprinkled with blackish posteriorly. Thorax black, with a conspicuous ochreous patch posteriorly. Forewings black, faintly sprinkled with whitish scales outwardly, and with several clear white spots or streaklets; of these the most conspicuous is a clear white costal spot at one-fourth from the apex, an oblique dorsal streak a little beyond it pointing outward; at the end of the cell is an ocelloid spot formed by a slender white streak enclosing a dense spot of black scales, except at its lower edge; preceding this are two other white discal streaklets, and beneath the outer one of these is a dorsal streaklet crossing the fold about the middle of the wing; around the apex are six white streaklets in the dark cilia (three costal, three dorsal), the cilia becoming slightly paler along the dorsum. Exp. al. 11—12 mm. Hindwings and cilia fuscous (slightly paler than the dorsal cilia of the forewings). Abdomen blackish. Legs dark fuscous, with pale ochreous tibial and tarsal spots, spurs pale ochreous.

Type ♂ (28372); ♀ (28379) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., v. 1896. Two specimens.

This species differs from *petalifera* Wlsm., in the absence of the conspicuous white basal streak, and in the form of the white discal spots which are produced into minute streaklets, as well as in the colour of the palpi which at once distinguish it.

120. (17) *Neelysia petalifera*, sp. nov. (Pl. XVII. fig. 15).

Antennae leaden grey. Palpi, long slender, the terminal joint as long as the median; median joint white, terminal tawny fuscous. Head and Thorax fuscous. Forewings tawny fuscous, sparsely bestrewed with snow-white dots and with a narrow snow-white streak occupying the basal half of the fold; beyond this on the fold is a minute white oblique streaklet, and immediately above it, another on the cell, is followed by a similar one towards the end of the cell; beyond and above this is a larger white costal spot with another at the tornus below and beyond it, followed by three white terminal dots; cilia tawny fuscous. Exp. al. 11—12 mm. Hindwings and cilia tawny fuscous. Abdomen fuscous. Legs greyish fuscous, spurs whitish.

Type ♂ (26657); ♀ (28327) Mus. Wlsm.

HAB. MAUI: Olinda (Haleakala), 4000 ft., VI., 1894; Haleakala, 4000 ft., v. 1896. Three specimens.

121. (18) *Neelysia subaurata*, sp. nov. (Pl. XVII. fig. 16).

Antennae ochreous, faintly barred with fuscous. Palpi pale ochreous, slightly shaded with fuscous at the base externally and on the inner side along the terminal joint. Head ochreous, shaded with fuscous, the face paler. Thorax bronzy fuscous, tegulae touched with shining ochreous. Forewings golden yellowish, profusely sprinkled with bronzy fuscous scales; a small patch of this colour at the extreme base of the costa is followed by a minute elongate spot beneath it, in the fold are three elongate spots of the same, the middle one followed above by a conspicuous ovate discal spot, the outer one having a similar, but smaller and more rounded spot a little above it at the lower angle of the cell; around the apex are small pale ochreous spots alternating with darker streaks along the base of the brownish ochreous cilia. Exp. al. 11—13 mm.

Hindwings pale grey; cilia with a slight tinge of brownish ochreous. Abdomen brownish ochreous. Legs blackish, hind tibiae and tarsi barred with pale ochreous, spurs pale ochreous.

Type ♂ (27955); ♀ (27943) Mus. Wlsm.

Hab. Kauai: Kaholuamano, 4000 ft., iv. 1895. Two specimens.

122. (19) *Neelysia exaltata*, sp. nov. (Pl. XVII. fig. 17).

Antennae brownish cinereous, the basal joint fuscous above. Palpi white, the median joint shaded with fuscous nearly to its apex externally, the terminal joint tipped with fuscous. Head and Thorax white; tegulae ferruginous; ♂ with expansible, lateral thoracic hair-pencil. Forewings ferruginous, shaded with fuscous towards the apex, with an oblique white streak before the middle, crossing the fold, narrowly black-margined on its outer side; this is followed by an elongate white patch, extending beyond the end of the cell, with a few black scales along its inner and lower margins; a small white costal spot before the apex, another about the apex, and a few white terminal scales above the tornus; cilia ferruginous, tending to brownish grey about the tornus. Exp. al. 12—13 mm. Hindwings rather dark grey; cilia brownish grey. Abdomen dark grey. Legs bronzy fuscous, with white tarsal annulations, the spurs and ends of the tibiae also white.

Type ♂ (26564); ♀ (28471) Mus. Wlsm.

Hab. Maui: Haleakala, below 4000 to above 5000 ft., (1) iii. 1894, (11) v. 1896. Twelve specimens.

123. (20) *Neelysia poeciloceras*, sp. nov. (Pl. XVII. fig. 18).

Antennae pale ochreous, annulate with dark brownish fuscous. Palpi whitish ochreous, tinged with pale ferruginous. Head and Thorax whitish, with an ochreous tinge; tegulae light ferruginous; ♂ with expansible lateral thoracic hair-pencil. Forewings light ferruginous, with a short ill-defined basal patch and an oblique central fascia, scarcely reaching the costa, dark brownish ferruginous; the broad central band is narrowly margined on either side with black scales, beyond which on the inner side is a narrow, and on the outer side a wide outwardly produced band of yellowish white, the latter containing a small dark spot at the end of the cell, the extreme apex contains a few black scales; cilia ferruginous. Exp. al. 13—14 mm. Hindwings and cilia brownish cinereous. Abdomen brownish cinereous. Legs brownish fuscous, with very pale ferruginous spurs and tarsal annulations.

Type ♀ (26567); ♂ (28501) Mus. Wlsm.

Hab. Maui: Haleakala, below 4000 to 5000 ft., (1) iii. 1894, (5) v. 1896; Olinda (Haleakala), 4000 ft., (1) iv. 1894, (1) v. 1896. Eight specimens.

In some specimens the ground-colour is suffused with whitish, the markings appearing more distinct through the loss of the ferruginous ground-colour.

A single ♀ (26658) from Olinda, 4000 ft., IV. 1894, is smaller (exp. al. 10 mm.) and may be distinct.

124. (21) *Neelysia rediviva*, sp. nov. (Pl. XVII. fig. 19).

Antennae greyish fuscous. Palpi whitish, the median joint shaded externally with greyish fuscous nearly to its apex. Head whitish, more or less shaded with ferruginous. Thorax ferruginous; ♂ with expansible lateral hair-pencil. Forewings whitish, profusely clouded with shining ferruginous, of which an oblique quadrangular patch appears on the middle of the fold (this is more or less broken up in some of the varieties), and is outlined before and behind by the white ground-colour, which also encircles a small black dot at the end of the cell; a few black scales at the base of the costa and in the base of the apical and terminal cilia which are ferruginous, shading off to grey on the dorsum. Exp. al. 12—14 mm. Hindwings and cilia pale grey. Abdomen greyish. Legs pale ochreous, with fuscous tarsal and tibial bands.

Type ♂ (27371); ♀ (27117) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (3) IV. 1895; Mts., 3000—4000 ft., (1) VI. 1894. Four specimens.

The palpi of this species are smooth throughout, in this respect it differs from *poeciloceras*, which it greatly resembles. The spot at the end of the cell is scarcely traceable in some specimens, and the white scaling, which probably represents the real ground-colour, is in some specimens almost entirely obliterated.

125. (22) *Neelysia ningorella*, sp. nov. (Pl. XVII. fig. 20).

Antennae cinereous. Palpi fuscous, whitish at the end of the median joint, terminal joint with a whitish streak along the upper side. Head ♂, snow-whitish: ♀, rusty brown. Thorax ♂, snow-white, tegulae dark fawn-brown, with expansible lateral hair-pencil: ♀, rusty brown in front, whitish ochreous posteriorly, the tegulae similarly divided. Forewings ♂, bright brown, with several short longitudinal dark umber-brown striae scattered about their surface; a narrow patch of this colour occurs at the base of the dorsum, and is immediately succeeded by an elongate snow-white dorsal streak reaching to two-thirds, this is biangulated at its upper edge, the angles crossing the fold before and beyond its middle; above and beyond the outer angle is a small detached white dot on the cell, succeeded by another at the end of the cell containing a blackish central dot; around the apex and termen is a series of dark brownish fuscous spots at the base of the cilia, a few white scales accompanying them, especially towards the tornus; cilia brownish cinereous: ♀, rusty brown, the dorsal streak varying from pale brownish ochreous to tawny fuscous, its angles and the discal spots remaining white as in the ♂. Exp. al. 13—14 mm. Hindwings pale greyish; cilia pale brownish. Abdomen brownish cinereous. Legs dark brownish, with whitish tarsal and tibial annulations.

Type ♂ (26636); ♀ (26622) Mus. Wlsm.

Hab. Maui: Haleakala, 5000 ft. and above, iii.—iv. 1894. Three specimens.

The variation is probably individual rather than sexual.

126. (23) *Neelysia nemoricola*, sp. nov. (Pl. XVII. fig. 21).

Antennae cinereous, faintly annulate with white. Palpi whitish, the median joint shaded nearly to the apex externally. Head and Thorax white; tegulae rust-brown; ♂ with expansible lateral thoracic hair-pencil. Forewings rust-brown, a broad cream-white dorsal streak, from the base to the end of the fold, throws up two slight oblique excrescences at its upper edge, one before and one beyond the middle, but these are not clearly defined; a small dark spot at the end of the cell is half encircled by a narrow line of white; a few whitish scales appear in the base of the terminal cilia which are brown at the apex, at the tornus yellowish grey. Exp. al. 13 mm. Hindwings shining pale grey; cilia yellowish grey. Abdomen greyish. Legs whitish ochreous, with broad pale fuscous tarsal bands.

Type ♀ (26369); ♂ (26368) Mus. Wlsm.

Hab. Molokai: forest above Pelekunu, 21. ix. 1893. Two specimens.

This would be difficult to separate from some varieties of *argyresthiella* were it not for the smooth palpi which readily distinguish it. It approaches closely to *ningorella*, but the dorsal streak reaches to the base, and the unevenness on its upper edge is much less marked, while the spot at the end of the cell is certainly less conspicuous and the cilia are decidedly more inclined to yellowish grey in both wings, giving a brighter and paler appearance to the hindwings than can be found in the Maui species.

127. (24) *Neelysia argyresthiella*, sp. nov. (Pl. XVII. fig. 22).

Antennae fawn-brown, annulate with creamy white. Palpi cream-white, the median joint externally brown nearly to its apex, which is somewhat expanded by hair-scales. Head and Thorax cream-white, tegulae brown; ♂ with expansible lateral hair-pencil. Forewings cream-white, strongly smeared with fawn-brown and sprinkled with fuscous scales, except on the dorsal space below the fold; on the middle of the wing is an oblique elongate darkish brown patch, extending a little across the fold, a blackish ocellate spot at the end of the cell, a few brownish and fuscous ill-defined spots lie on the costa and termen and at the apex at the base of the pale brownish ochreous cilia.

Exp. al. 10—13 mm. Hindwings pale shining grey; cilia pale brownish cinereous. Abdomen pale brownish grey. Legs creamy whitish, broadly banded with brownish fuscous.

Type ♂ (25675); ♀ (25815) *Hawaii*, Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (2) IV. 1895; Mts., 3000—4000 ft., (4) VI. 1894.—OAHU: near head of Kawailoa Gulch, (1) IV. 1893; Waianae Mts., about 2000 ft., (2) IV. 1893.—HAWAII: Kona, 2000 ft., (1) VI. 1892, 5000 ft., (1) 30. VI. 1892, 4000 ft., (2) 13—17. VIII. 1892, 3000 ft., (2) IX. 1892; Hualalai (Kona), 5000 ft., (1) 5. VIII. 1892; Kaawaloa (Kona), above 2000 ft., (1) IX. 1892; Olaa, (1) IX. 1896; Hilo, 2000 ft., (1) XII. 1895. Nineteen specimens.

128. (25) *Neelysia mactella*, sp. nov. (Pl. XVII. fig. 23).

Antennae pale ochreous. Palpi whitish, median joint shaded with fuscous externally nearly to its apex, which is widened with projecting scales. Head and Thorax whitish ochreous; tegulae shining, brownish ochreous; ♂ with expansible lateral thoracic hair-pencil. Forewings shining, brownish ochreous, more or less sprinkled with blackish, and sometimes with a few white scales tending to run in lines; an elongate fuscous spot in the middle of the fold is sometimes dilated obliquely upward; cilia at the apex and termen shining brownish ochreous, on the dorsum pale yellowish grey. Exp. al. 11—12 mm. Hindwings shining, very pale grey; cilia pale yellowish grey. Abdomen brownish ochreous. Legs whitish ochreous, with fuscous shade-bands.

Type ♂ (27156); ♀ (26784) *Kauai*, Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (1) IV. 1895; Mts., 3000—4000 ft., (7) V.—VI. 1894.—OAHU: Waianae Mts., above 2000 ft., (1) IV. 1892.—MOLOKAI: about 4000 ft., (2) 22. V. 1893. Eleven specimens.

Perhaps allied to *poeciloceras*, but smaller and more slender with distinctly ochreous colouring. Two specimens from Molokai (26233—4) would only be separable from this series through their slightly larger size, one of them having also slightly darker hindwings, but in the absence of better evidence to the contrary I can only regard them as varieties.

129. (26) *Neelysia tischeriella*, sp. nov. (Pl. XVII. fig. 24).

Antennae brownish fuscous. Palpi pale ochreous, shaded with fuscous externally on the median joint. Head and Thorax bright orange-ochreous; ♂ with expansible lateral thoracic hair-pencil. Forewings bright orange-ochreous, shaded with brownish fuscous along the costal half of the wing, but not below the fold; this costal shading is somewhat condensed at the base, but diluted and diffused to the apex; there is no indication of discal spots; cilia orange-ochreous at the apex, shading to pale grey on the dorsum. Exp. al. 10 mm. Hindwings and cilia shining, pale grey. Abdomen greyish. Legs pale greyish, with brownish fuscous tarsal bands.

Type ♂ (27901); ♀ (27902) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895. Five specimens.

130. (27) *Neelysia complanella*, sp. nov. (Pl. XVII. fig. 25).

Antennae brownish ochreous, with very faint pale annulations. Palpi, Head, Thorax, and Forewings unicolorous brownish ochreous; cilia greyish ochreous on the dorsum. Exp. al. 10 mm. Hindwings pale grey; cilia very pale brownish ochreous. Abdomen pale brownish ochreous. Legs whitish ochreous.

Type ♂ (26129) Mus. Wlsm.

HAB. MOLOKAI: above 3000 ft., 13. VI. 1893; about 4000 ft., VI. 1893. Two specimens.

131. (28) *Neelysia sciurella*, sp. nov. (Pl. XVII. fig. 26).

Antennae brown. Palpi ferruginous, paler on the inner sides. Head and Thorax brownish ferruginous. Forewings shining, brownish ferruginous, cilia shading to dark grey; a small plical spot is noticeable, but no other markings are to be found on the wing-surface. Exp. al. 11 mm. Hindwings and cilia dark grey. Abdomen dark grey. Legs dark grey, with faintly paler tarsal spots.

Type ♂ (26684) Mus. Wlsm.

HAB. MAUI: Olinda (Haleakala), 4000 ft., IV. 1894. Unique.

132. (29) *Neelysia incongrua*, sp. nov. (Pl. XVII. fig. 27).

Antennae fuscous. Palpi smooth, the terminal joint not longer than the median; pale ochreous. Head pale ochreous. Thorax, Forewings, and cilia unicolorous fawn-brown, without trace of any markings; underside greyish fuscous, the cilia showing a paler brown tint. Exp. al. 11—12 mm. Hindwings and cilia dark greyish brown; underside as in the forewings. Abdomen greyish brown. Legs greyish fuscous, with faint pale tarsal spots.

Type ♂ (26613); ♀ (26572) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 to about 6000 ft., III.—IV. 1894, V. 1896. Three specimens.

An inconspicuous species differing from all others in tone of colour combined with absence of markings; it should be easily recognised.

133. (30) *Neelysia semifusa*, sp. nov. (Pl. XVII. fig. 28).

Antennae blackish. Palpi pale ochreous, the terminal joint blackish beneath and at the apex. Head pale ochreous. Thorax dull ochreous. Forewings dull ochreous, with a suffused dark fuscous shade along the costa, becoming less conspicuous outward, but continued to the apex and faintly traceable around the termen to the tornus, where there is a small dark fuscous spot; cilia dull ochreous, shading to fuscous on the dorsum. Exp. al. 10 mm. Hindwings dark leaden grey; cilia tawny grey. Abdomen greyish fuscous. Legs greyish fuscous, with paler tarsal spots.

Type ♀ (26096) Mus. Wlsm.

HAB. MOLOKAI: about 4000 ft., VI. 1893. Two specimens.

134. (31) *Neelysia terminella*, sp. nov. (Pl. XVIII. fig. 1).

Antennae dark umber-brown. Palpi umber-brown, whitish on their inner sides and externally at the apex of the median joint, which is widened by expanding scales. Head and Thorax umber-brown; ♂ with expansible lateral thoracic hair-pencil. Forewings umber-brown with a faint tawny suffusion and minute pale sprinkling; in the fold beyond its middle are two minute whitish dots, the space between them being a little darker than the ground-colour; a few whitish ochreous scales along the termen and at the apex in the base of the tawny brownish cilia are accompanied by one or two minute whitish scale-dots a little below the apex. Exp. al. 12 mm. Hindwings and cilia dark tawny grey. Abdomen dark tawny fuscous, anal segments whitish ochreous. Legs umber-brown, with pale spurs and tarsal annulations.

Type ♂ (26593) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., III. 1894. Unique.

At first sight this might be regarded as a somewhat faded specimen of *Hyposmocoma fuscopurpurea.*

23. DYSPHORIA, gen. nov.

(δυσφορία = indignation.)

Type ♂ ♀ *Dysphoria semicolon* Wlsm.

Antennae shorter than the forewings; slightly serrate, uniciliate (½); basal joint somewhat flattened, without pecten. Maxillary Palpi short, dependent. Labial Palpi recurved, slightly more slender in the ♀ than in the ♂; median joint with appressed scales; terminal joint scarcely as long as the median. Haustellum moderate, scaled. Head and Thorax with appressed scales; face smooth. Forewings elongate, apex obtusely pointed, termen obliquely rounded; without tufts of raised scales: neuration 12 veins; 7 and 8 stalked, 7 to costa; 6 approximated to 7, remote from 5; 4 and 5 connate or short-stalked; 3 approximate to 4; media weak, from between 6 and 7 to beyond 11. Hindwings not broader than the forewings, obtusely lanceolate; cilia 1; ♂ with strong subcostal hair-pencil above: neuration 8 veins; 6 and 7 separate, approximating towards base; 5 remote from 6, connate or stalked with 4, or sometimes 4 and 5 closely approximated; 3 equidistant between 4 and 2; 8 free. Abdomen somewhat depressed; ♂ with genital segments recurved, strongly developed; ♀ with ovipositor extruded. Legs, hind tibiae with long dense hairs above.

135. (1) *Dysphoria semicolon*, sp. nov. (Pl. XVIII. fig. 2).

Antennae ochreous, faintly spotted above with brownish fuscous, the basal joint brownish fuscous above nearly to its apex. Palpi pale ochreous, the median joint with a broad brownish fuscous streak extending beyond its middle on the outer side, followed by a spot of the same colour near the apex which partly extends around the inner side, a brownish fuscous ring around the base of the terminal joint. Head tawny, face shining greyish. Thorax dark tawny. Forewings dark tawny, with a bronzy gloss; a plical spot at one-third from the end of the fold, followed by a discal spot above it, and another at the end of the cell, are but faintly indicated in a darker shade by a few cinereous scales, sometimes noticeable at their outer edges; cilia tawny, with a slight ochreous tinge on their outer half. Exp. al. 18—20 mm. Hindwings pale, shining, tawny grey, becoming lighter towards the base; cilia tawny brownish grey; ♂ with a pale ochreous subcostal hair-pencil. Abdomen brownish grey. Legs pale brownish grey, tarsi shaded above between the joints.

Type ♂ (27923); ♀ (26905) Mus. Wlsm.

Hab. Kauai: Kaholuamano, 4000 ft., (22) iv. 1895; Mts., 3000—4000 ft., (7) v. 1894, (12) vi. 1894. Forty-one specimens.

Apart from structural characters the colouring of the palpi at once distinguishes this species from those which resemble it in appearance.

24. Bubaloceras, gen. nov.

(*βούβαλος* = buffalo; *κέρας* = horn.)

Type *Bubaloceras subeburneum* Wlsm.

Antennae ♂, biserrate, the basal joint strongly curved, flattened and dilated, with well-developed pecten. Maxillary Palpi short, inverted. Labial Palpi very long, strongly recurved, terminal joint longer than median, the latter slightly clothed beneath. Haustellum well-developed, scaled. Head and Thorax smooth. Forewings elongate, acutely lanceolate: neuration 12 veins; 7 and 8 stalked, 7 to costa. Hindwings narrower than the forewings, acutely lanceolate; ♂ without subcostal hair-pencil: neuration 8 veins; all separate. Abdomen moderate. Legs with hairy hind tibiae.

Allied to *Hyposmocoma* Btl., but at once separated by the peculiar form of the basal joint of the antennae.

136. (1) *Bubaloceras subeburneum*, sp. nov. (Pl. XVIII. fig. 3).

Antennae bone-whitish. Palpi bone-white, a reduplicated brownish line along the terminal joint beneath. Head and Thorax bone-whitish. Forewings bone-whitish, a small blackish spot at the base of the costa and four very faintly indicated brownish ochreous dots, two on the fold, two on the cell, the first plical anterior to the first discal; cilia pale brownish ochreous. Exp. al. 18 mm. Hindwings grey; cilia pale brownish ochreous; ♂ without subcostal hair-pencil. Abdomen grey. Legs, hind tibiae pale brownish ochreous, tarsi bone-whitish, shaded with dark grey above.

Type ♂ (26107) Mus. Wlsm.

HAB. MOLOKAI: about 4000 ft., 9. VI. 1893. Unique.

25. HYPOSMOCOMA Btl.

(ὕποσμος = subject to the smell; κόμη = hair.)

Type ♂ *Hyposmochoma blackburnii*, Btl. (Btl., 1881).

† HYPOSMOCHOMA Btl., Ann. & Mag. NH. (5. s.), VII. 399—400 (1881).
‡ HYPOSMOCOMA Btl., (emend. Wlsm.)

Antennae shorter than the forewings, slightly serrate towards the apex, basal joint somewhat enlarged outwardly, with a fugitive pecten. Maxillary Palpi short, dependent. Labial Palpi recurved, smooth, terminal joint slightly shorter, as long, or longer than the median joint; the latter sometimes with a few hair-scales towards its tip. Ocelli absent. Haustellum well-developed, scaled. Head and Thorax with appressed scales, the latter sometimes with lateral expansible hair-pencil. Forewings elongate, apex obtusely pointed, termen obliquely rounded; surface with or without tufts of raised scales; ♂ usually with a fringe of hair-scales along vein 12 on the underside, this fringe is sometimes rather strongly developed (e.g. *marginenotata*): neuration 12 veins; 7 and 8 stalked, 7 to slightly above apex (in exceptional specimens of *commensella*, 7 and 8 are closely approximate, almost connate; or stalked in one wing and separated by a slight space in the other wing); remaining veins separate, 3 and 5 both approximated to 4. Hindwings not broader than the forewings, obtusely lanceolate; ♂ with or without expansible subcostal hair-pencil, sometimes strongly developed; cilia (1): neuration 8 veins, all separate; 6 and 7 approximating towards origin; 3 and 5 both approximated to 4; 8 free. Abdomen somewhat depressed; anal appendages well developed. Legs, hind tibiae hairy, the hairs often fugitive.

A variable genus containing many species in a plastic state of development.

Distinctions founded on the relative lengths of the joints of the palpi, the comparative breadth of the wings, the presence or absence of raised scales, and the possession or lack of secondary sexual characters, which at first seemed of morphic value, and to indicate the possibility of subdividing the long series of species included in this genus, had to be abandoned for intermediate forms rendered it impossible to maintain any subdivision however distinct the subdivision appeared to be when founded on a single species.

The genus *Hyposmocoma* is allied to *Mompha* Hb., *Walshia* Clms., and *Limnaecia* Stn., but the hindwings are broader. Some species (e.g. *radiatella*) are very close to *Limnaecia*, which they much resemble, but the antennae are not ciliate and the head is rougher.

The union of *Stagmatophora* HS., (= *Pyroderces* HS., Meyr.) and *Limnaecia* Stn., Meyr., would justify the inclusion of *Hyposmocoma* in such an extended genus, but as at present constituted *Hyposmocoma* differs from each of these genera as they differ from each other.

Without seeing the ♂ of *Atremaea lonchoptera*, Stgr., I should not be prepared to sink *Hyposmocoma* as a synonym of *Atremaea*, Stgr., but I am at least extremely suspicious that these genera will be proved to be identical.

The ♀ of *Atremaea* is practically indistinguishable generically from the broader-winged forms which are here included in *Hyposmocoma*, the palpi resembling those of certain species in which they are less slender and in which the median and terminal joints are of equal length (e.g. *epicharis*, Wlsm.).

The generic name was obviously given in reference to the subcostal hair-pencil, "presumably a scent-fan" (Btl. *l.c.*). *Hyposmochoma* (χῶμα = a heap) would be neuter, and it seems advisable to make the slight correction to *Hyposmocoma* (κόμη = hair), *feminine*, which was doubtless intended.

137. (1) *Hyposmocoma exornata*, sp. nov.

137$^{\mathrm{a}}$. (1$^{\mathrm{a}}$) *exornata*, sp. nov. + *exornata*, var. nov. (Pl. XVIII. fig. 4).

Antennae blackish. Palpi, median joint black, tipped with white, a narrow white line along the under side; terminal joint shorter than the median, white, with a broad black band around its middle. Head whitish primrose. Thorax black, the tegulae tipped with primrose. Forewings black, with an elaborate primrose-yellow pattern along the dorsal half from base to apex; this consists of a line commencing on the fold at the base, dilated downwards along the base of the dorsum and enclosing an inverted black dorsal triangle below the fold, above the outer end of which the primrose plical line throws a projection, upwards and outwards across the cell, before descending to the dorsum, along which it is continued to the apex; opposite to the middle of the dorsum this primrose line forms an angular projection, of which the apex is abruptly terminated at the upper edge of the cell, its centre consisting of an equilateral triangular black patch, a little beyond which, opposite to the tornus, a slender curved projection again emerges from the primrose dorsal streak forming, with the outer and projecting parts of the preceding pattern, a sickle-shaped figure—these patterns are connected throughout and clearly defined; a series of four primrose costal spots occurs in the cilia before the apex, with three or four smaller primrose spots in the base of the terminal cilia, with these exceptions the cilia are blackish, becoming brownish fuscous towards the tornus; under side blackish, with some whitish spots on the costal cilia and around the termen, where they tend to form a terminal line. Exp. al. 18—21 mm. Hindwings brownish grey; cilia the same, with a paler line along their base; ♂ without subcostal hair-pencil. Abdomen brownish grey. Legs blackish, with whitish tarsal spots; posterior legs whitish, with brownish grey hairs above, tarsi with blackish spots.

Type ♂ (25554); ♀ (27409) Mus. Wlsm.

HAB. HAWAII: Kona, 3000 ft., (1) 25. VI. 1892, 4000 ft., (1) VII., (1) 10. VIII., (1) 9. IX. 1892; Hualalai (Kona), 5000 ft., (1) 5. VIII. 1892; Mt. Kilauea, (1) VII. 1895. Six specimens.

137^b. (1^b) *exornata*, Wlsm. + *flavicosta* var. nov. (Pl. XVIII. fig. 5).

Forewings with the costa from near the base to two-thirds primrose-yellow, connected with the plical line by its first upward projection, and thus cutting off a basal triangle of the black ground-colour.

Type ♂ (28742) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VIII. 1896. Unique.

138. (2) *Hyposmocoma oculifera*, sp. nov. (Pl. XVIII. fig. 6).

Antennae brownish fuscous, with faintly indicated paler bands on the outer half. Palpi, median joint brownish fuscous, white towards its apex; terminal joint nearly as long as the median, white, with a brownish fuscous spot on the outer side before the apex. Head and Thorax white. Forewings with the costal portion brownish fuscous, forming two triangular patches connected by a narrow band on the costa before the middle; the basal, crossing the fold but not reaching the dorsum, is smaller than the outer which extends along the termen to the apex and contains some small reduplicated white costal spots before the apex and a small white patch at the end of the cell; the dorsal portion of the wing is shining white from base to tornus, the large triangular central space between the two connected costal patches contains in its middle a conspicuous brownish fuscous patch, resting on but scarcely crossing the fold; cilia white. Exp. al. 18—19 mm. Hindwings brownish grey; cilia pale brownish; ♂ without subcostal hair-pencil. Abdomen brownish grey; anal tuft cinereous. Legs pale cinereous.

Type ♂ (26982) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., V. 1894. Two specimens.

139. (3) *Hyposmocoma nigralbida*, sp. nov. (Pl. XVIII. fig. 7).

Antennae black, a few white scales at the apex of the basal joint. Palpi black, a white ring around the ends of the median and terminal joints, the latter also dusted with white scales. Head and Thorax white in the middle, black at the sides, the latter with some raised brownish scales posteriorly. Forewings with a black basal patch, scarcely wider on the dorsum than on the costa, slightly indented on the fold; this is followed by a white band, dilated downward from the costa to above the middle of the dorsum, thence extended to the tornus along the dorsum whence it throws up an obtusely angled projection into the black space above it and a second narrow tooth-like projection towards the termen; above this is a white costal spot, a second white spot lying about the middle of the costa (these vary in size); raised tufts of white, or white and ochreous scales occur below the fold; the remainder of the wing, including the cilia, is deep black like the basal patch; tornal cilia tending to brownish grey; under side brownish grey, with a white costal spot before the apex. Exp. al. 16—18 mm. Hindwings and cilia brownish grey; subcostal hair-pencil in the ♂ black. Abdomen brownish grey. Legs black, with white tibial and tarsal annulations; hind tibiae with white spurs and clothed with long greyish hairs above.

Type ♀ (26792); ♂ (26760) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (4) V. 1894, (14) VI. 1894. Eighteen specimens.

140. (4) *Hyposmocoma nividorsella*, sp. nov. (Pl. XVIII. fig. 8).

Antennae blackish above, faintly banded with brownish cinereous beneath. Palpi black, the apex of the median joint white; terminal joint nearly as long as the median, strongly sprinkled with white, especially about the base and apex. Head white above, narrowly black at the sides; face black. Thorax white, black at the sides; tegulae black. Forewings blue-black, a broad snow-white streak along the dorsum from near the base to the middle of the termen; without tufts of raised scales; from this white dorsal space, towards the base, a narrow white band extends obliquely nearly to the costa, thus forming a black basal patch; beyond the middle are two dentate projections from the white space encroaching upon the black ground-colour above it; a short white streak lies on the middle of the costa, and a triangular white costal spot before the apex is opposite to the outer extremity of the white dorsal band; cilia blackish towards the apex, brownish grey mixed with white about the tornus; underside brownish cinereous, with a white costal streak before the apex. Exp. al. 16—18 mm. Hindwings brownish grey; cilia very pale brownish; ♂ with a long blue-black subcostal hair-pencil. Abdomen brownish grey. Legs brownish fuscous, with whitish tarsal and tibial annulations; spurs white, with dark lines beneath them; hind tibiae clothed with long greyish hairs above.

Type ♂ (26731); ♀ (26761) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (3) V. 1894, (6) VI. 1894. Nine specimens.

141. (5) *Hyposmocoma corvina*, Btl. (Pl. XVIII. fig. 9).

Laverna corvina Btl., Ann. & Mag. NH. (5. s.), VII. 405, No. 47 (1881)[1].

Antennae blackish, basal joint edged with whitish at its extremity. Palpi black, sprinkled with whitish scales, the tips of the median and terminal joints whitish ochreous. Head brownish ochreous, shaded on the front and sides with purplish fuscous (sometimes entirely suffusing the head). Thorax purplish fuscous, sometimes mixed with brownish ochreous. Forewings sooty-black, with whitish or pale ochreous markings; without raised scales; a pale ochreous costal streak near the base communicates with a pale dorsal patch of the same colour, sometimes extending from near the base to two-thirds, its upper edge indented on the middle by a convex extension of the dark ground-colour, with a small triangular ochreous tornal spot; in some varieties the white dorsal patch extends to the tornal spot, but they are usually separated by the dark ground-colour; in other varieties the dark ground-colour encroaches on the pale dorsal patch, limiting it to a cuneate patch below the fold, and thus forming with the costal streak an ochreous ∟-shaped marking; opposite to the tornal spot is a small triangular pale brownish ochreous (or whitish) costal spot before the apex; cilia blackish, mixed with brownish or ochreous at the tornus; underside brownish fuscous, with a pale ochreous costal spot before the apex. Exp. al. 16—18 mm. Hindwings and cilia brownish grey; ♂ with a dark purplish black subcostal hair-pencil. Abdomen dark brownish grey, shining ochreous beneath; anal tuft paler. Legs blackish, with pale ochreous tibial and tarsal annulations; hind tibiae with long pale ochreous hairs above.

Type ♂ (122: 81. 7) Mus. Br. [Caenotypes ♂ (28375, 26190, 26673) Mus. Wlsm.]

HAB. MOLOKAI: about 4000 ft., (2) 22. V. 1893, (2) VI. 1893 (Perkins).—MAUI: Haleakala (Blackburn)[1]; Olinda (Haleakala), 4000 ft., (2) IV. 1894, (3) V. 1896; Haleakala, 5000 ft., (7) V. 1896 (Perkins). Sixteen specimens.

142. (6) *Hyposmocoma discella*, sp. nov. (Pl. XVIII. fig. 10).

Antennae fuscous above, barred with white beneath. Palpi blackish, with a white ring at the end of the median joint; terminal joint tipped with white. Head white, the space around the eyes blackish; face greyish fuscous. Thorax dark tawny fuscous, with a large white patch posteriorly (the white portions of the head and thorax are sometimes undivided). Forewings dark tawny fuscous, with a few white scales at the commencement of the costal cilia and a white dorsal streak from near the base to a little beyond the tornus; this streak is irregularly dentate along its upper edge, throwing four projections upward, the first wider than the others; without raised scales; cilia brownish grey, ochreous at the tornus. Exp. al. 16—20 mm. Hindwings pale, shining, steel-grey; cilia brownish grey, inclining to ochreous; ♂ with a leaden grey subcostal hair-pencil. Abdomen grey. Legs pale tawny fuscous, with white tarsal annulations.

Type ♀ (27907); ♂ (27908) Mus. Wlsm.

HAB. KAUAI: KahoInamano, 4000 ft., (3) IV. 1895. Larva IV. (1) excl. ee V. 1895. Four specimens.

Larva in an irregular case of silk and frass encrusted with miscellaneous fragments (some of them apparently insect remains). "Bred from 'Olapa' (*Cheirodendron*), 'Lehua' (*Metrosideros*), &c., probably lichenivorous" (Perkins).

143. (7) *Hyposmocoma divisa*, sp. nov. (Pl. XVIII. fig. 11).

Antennae brownish fuscous. Palpi brownish fuscous, the median joint with a creamy white ring at its apex, terminal joint shaded with whitish scales. Head creamy white, the face and around the eyes dark brownish fuscous. Thorax creamy white; tegulae dark brownish fuscous. Forewings along the costal two-thirds of their width dark brownish fuscous, extending through the apical cilia; along the dorsal third and extending through the terminal cilia creamy white, sparsely bestrewed before the middle with brownish fuscous scales; tornal cilia greyish. Exp. al. 14—18 mm. Hindwings grey; cilia with a brownish tinge; ♂ with a dark grey subcostal hair-pencil. Abdomen brownish grey. Legs brownish cinereous, the tarsi with darker transverse shading.

Type ♂ (27015); ♀ (27233) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., VI. 1894. Ten specimens.

144. (8) *Hyposmocoma partita*, sp. nov. (Pl. XVIII. fig. 12).

Antennae fuscous. Palpi fuscous, sprinkled externally and almost suffused on the inner side with pale ochreous. Head pale ochreous, face grey. Thorax pale ochreous. Forewings with the costal half dark fuscous, sprinkled with pale ochreous scales, and a pale ochreous costal spot before the apex; dorsal half pale ochreous, sprinkled with fuscous scales, the pale colour not extending above the middle of the termen; cilia very pale ochreous, smeared with fuscous about the apex and on the upper half of the termen. Exp. al. 14 mm. Hindwings shining, pale brownish grey, cilia brownish grey; ♂ with a dark leaden grey subcostal hair-pencil. Abdomen greyish fuscous above, whitish ochreous beneath. Legs greyish, scarcely pale-spotted at the tarsal joints.

Type ♂ (28615) Mus. Wlsm.

HAB. HAWAII: Hilo, 2000 ft., I. 1896. Unique.

145. (9) *Hyposmocoma trossulella*, sp. nov. (Pl. XVIII. fig. 13).

Antennae greyish fuscous, the basal joint darker than the stem. Palpi greyish fuscous, the upper extremity of the median joint whitish ochreous, the terminal joint sprinkled with whitish ochreous. Head greyish fuscous, with some whitish ochreous lateral scales above the eyes. Thorax greyish fuscous, with a whitish ochreous spot posteriorly. Forewings greyish fuscous; a broad whitish ochreous streak, commencing narrowly near the base of the costa, is dilated downward and outward to the dorsum which it follows to the termen; a triangular spot of the same colour, lying on the costa above its outer extremity, is preceded by a smaller spot a little beyond the middle of the costa which is very narrowly whitish ochreous between them; a plical spot lies at the upper edge of the pale dorsal streak, but is scarcely distinguishable from the dark ground-colour; cilia greyish fuscous at the apex, partaking of pale ochreous where that colour touches the margins. Exp. al. 12 mm. Hindwings and cilia brownish grey; ♂ with a dark fuscous subcostal hair-pencil. Abdomen whitish ochreous, banded across the middle and on the claspers with greyish fuscous. Legs whitish ochreous, with faint tarsal spots.

Type ♂ (26016) Mus. Wlsm.

HAB. OAHU: Waianae Mts., about 2000 ft., IV. 1892. A single specimen taken on tree-trunks.

146. (10) *Hyposmocoma atrovittella*, sp. nov. (Pl. XVIII. fig. 14).

Antennae brown. Palpi white, with three brownish fuscous spots, one at the base and one near the apex of the median joint, the third before the end of the terminal joint. Head and face white, with a greyish median cloud. Thorax brownish fuscous; tegulae white. Forewings white, with a short brownish fuscous basal patch and a broad brownish fuscous shade commencing on the costa at one-fourth from the base, its inner margin descending obliquely outward to the middle of the fold, thence overshadowing the remainder of the wing to the apex, with the exception of the dorsum below the fold and the white terminal cilia. Exp. al. 12 mm. Hindwings and cilia brownish grey; ♂ with a blackish subcostal hair-pencil. Abdomen brownish, anal tuft whitish ochreous. Legs whitish ochreous.

Type ♂ (28054) Mus. Wlsm.

HAB. HAWAII: Olaa, IX. 1896. Unique.

147. (11) *Hyposmocoma nebulifera*, sp. nov. (Pl. XVIII. fig. 15).

Antennae annulate with black and pale sandy ochraceous; the basal joint black, with an ochreous spot at its apex beneath. Palpi black, sprinkled with ochreous, the end of the median joint and the base and apex of the terminal joint pale ochreous. Head and Thorax pale sandy ochraceous, the latter with a black spot on the posterior margin, and the tegulae touched with black at each extremity. Forewings pale sandy ochraceous, with two short black patches at the base, one along the costa, the other extending a little further along the dorsum; at about one-fourth from the base a large blackish cloud-patch, commencing on the costa, extends obliquely outward and crossing the fold, but not reaching the dorsum, obscures the whole remaining surface of the wing with the exception of the dorsum and a small pale ochreous costal spot before the apex; its lower edge is somewhat undulating and contrasts strongly with the pale sandy ochraceous margin and cilia beneath and beyond it. Exp. al. 11 mm. Hindwings brownish grey, the cilia slightly paler; ♂ with a dark greyish subcostal hair-pencil. Abdomen brownish grey above; the under side and anal tuft pale ochreous. Legs whitish ochreous, with fuscous patches on the outer sides of the tibiae, and on the upper sides of the tarsi.

Type ♂ (25861) Mus. Wlsm.

HAB. OAHU: Mts., near Honolulu, 2000 ft., x. 1892. Unique.

148. (12) *Hyposmocoma torquata*, sp. nov. (Pl. XVIII. fig. 16).

Antennae dark tawny fuscous above, whitish ochreous beneath, with some bright ochreous scales at the end of the basal joint. Palpi whitish ochreous, shaded externally with tawny grey along the middle of both joints; the terminal joint shorter than the median. Head dark tawny fuscous, with a narrow bright ochreous collar-ring behind. Thorax dark tawny fuscous. Forewings dark tawny fuscous, with a large whitish ochreous dorsal patch at the base, nearly reaching the costa beyond its base; a triangular whitish ochreous dorsal spot at the tornus, its apex pointing outward in the direction of a smaller costal spot of the same colour a little beyond it; cilia dark tawny fuscous, with one or two whitish scales at their base. Exp. al. 10—12 mm. Hindwings coppery brown; cilia tawny; ♂ without subcostal hair-pencil. Abdomen brownish. Legs brownish, with whitish ochreous spurs and tarsal spots.

Type ♂ (27185) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., v.—vi. 1894. Two specimens.

149. (13) *Hyposmocoma notabilis*, sp. nov. (Pl. XVIII. fig. 17).

Antennae pale ochreous, distinctly barred above with dark brown; basal joint dark brown. Palpi long, slender, recurved, median and terminal joints of equal length; pale ochreous, the terminal joint smeared with dark brown above near the apex. Head brownish ochreous, face pale ochreous. Thorax dark brown. Forewings with a dark brown basal patch, narrow on the costa, dilated obliquely outwards to the dorsum; this is separated from a large quadrangular dark brown costal patch by a broad whitish ochreous oblique band which becomes brownish ochreous along the dorsum and whitish ochreous again about the tornus, where it is scarcely separated from a whitish ochreous inverted ante-apical patch by a brown shade extending to the apex and through the apical cilia; a diffused brownish ochreous spot on the costa at about the middle of the quadrangular costal patch is absent in some specimens; cilia pale brownish ochreous, bestrewed with dark brown scales. Exp. al. ♀ 17; ♂ 21 mm. Hindwings and cilia brownish grey; ♂ with a short greyish subcostal hair-pencil. Abdomen dark greyish brown above, ochreous beneath. Legs dark brownish, spurs and tarsal joints whitish ochreous; hind tibiae with long brownish hairs.

Type ♂ (26065); ♀ (26195) Mus. Wlsm.

HAB. MOLOKAI: above 3000—above 4000 ft., 31. v.—vi. 1893. Two specimens.

150. (14) *Hyposmocoma lebetella*, sp. nov. (Pl. XVIII. fig. 18).

Antennae dark umber-brown. Palpi slender, recurved, median joint whitish ochreous; terminal joint as long as the median, dark brown, sparsely sprinkled with whitish ochreous. Head pale ochreous. Thorax dark umber-brown, tegulae tipped with white. Forewings dark umber-brown, with a broad white subterminal fascia connected with a narrow white dorsal band coming from the base; along the edge of the dark brown colour are a few rich brownish ochreous scales, as also on the costa at the upper extremity of the subterminal fascia; a short outwardly oblique costal streak, at one-fifth from the base, is white, with some ochreous scales, but does not reach the dorsal band, there are also a few ochreous scales about the middle of the costa; cilia rich brownish ochreous, sparsely sprinkled with brown, at the extreme apex dark brown. Exp. al. 18—21 mm. Hindwings grey; cilia brownish grey; ♂ without subcostal hair-pencil. Abdomen brownish grey. Legs brownish grey, hind tibiae broadly banded with dark brown, the joints whitish ochreous.

Type ♂ (26651); ♀ (28520) Mus. Wlsm.

HAB. MAUI: Olinda (Haleakala), 4000 ft., (1) IV. 1894, (3) V. 1896; Haleakala, 4000—5000 ft., (6) V. 1896. Ten specimens.

151. (15) *Hyposmocoma tenuipalpis*, sp. nov. (Pl. XVIII. fig. 19).

Antennae brown. Palpi brown, the median joint sprinkled and tipped with pale ochreous; terminal joint as long as the median, slender, sparsely sprinkled and tipped with pale ochreous. Head pale ochreous. Thorax dark umber-brown, tegulae tipped with pale ochreous. Forewings dark umber-brown, with a pale ochreous dorsal band, mixed with some white scales, this band is narrow, but sends up two short angular projections into the brown ground-colour; from the first of these a narrow whitish ochreous band slopes obliquely backward to the costa at one-fifth from the base, while from the outer extremity of the dorsal band an oblique fascia crosses outward to the costa and is much diffused on its outer side with white scales reaching nearly to the termen; on the middle of the costa is a small brownish ill-defined patch; cilia brownish ochreous, somewhat shaded with umber-brown, a few small pale ochreous costal and terminal spots around their base. Exp. al. 14—15 mm. Hindwings grey; cilia brownish; ♂ without subcostal hair-pencil. Abdomen dark brown. Legs brownish ochreous, tibiae shaded with brownish fuscous.

Type ♂ (26373); ♀ (26367) Mus. Wlsm.

HAB. MOLOKAI: above 4500 ft., (1) VII. 1893; above 4500—5000 ft., (5) 7.—23. IX. 1893; forest above Pelekunu, (2) 21. IX. 1893. Eight specimens.

152. (16) *Hyposmocoma commensella*, sp. nov. (Pl. XVIII. fig. 20).

Antennae ochreous, the basal joint brownish fuscous. Palpi brownish fuscous, dusted with pale ochreous, especially on the inner side and around the apex of the median joint. Head brownish ochreous, smeared with bronzy brown above. Thorax dark bronzy brown, touched with ochreous posteriorly and on the ends of the tegulae. Forewings dark bronzy brown, the dorsum and terminal cilia shining ochreous; the upper edge of the pale dorsal streak sends three dentate projections obliquely outward, and above the last, which is produced beyond the tornus, is a pale ochreous costal spot, the greyish fuscous costal cilia beyond it being streaked with ochreous. Exp. al. 18—20 mm. Hindwings shining, pale yellowish grey; cilia ochreous; ♂ without subcostal hair-pencil. Abdomen brownish grey. Legs pale ochreous, the tarsi shaded, except at the joints, with brownish grey.

Type ♂ (28101); ♀ (28099) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VIII. 1896. Eight specimens.

This species is the most generalised of the group, veins 7 and 8 of the forewings, which are normally stalked, being in two specimens (28102—3) separated by a small space (almost connate), while in one specimen (28104) these veins are stalked in one wing and closely approximated in the other. The only ♀ met with has these veins stalked.

153. (17) *Hyposmocoma leporella*, sp. nov. (Pl. XVIII. fig. 21).

Antennae ochreous, the basal joint brownish fuscous. Palpi, terminal joint as long as median; ochreous, median joint shaded externally with brownish fuscous. Head brownish fuscous; face shining cinereous. Thorax brownish fuscous; tegulae ochreous except at their base. Forewings ochreous, blotched, mottled and bestrewed with shades of umber-brown and brownish fuscous, of which the most noticeable are a short basal patch, of mixed brownish fuscous and umber-brown, which sends out an acutely projecting angle along the fold to one-fifth from the base; a broad, median, dark umber-brown patch, or band, occupying the middle third of the costa, extends nearly to the dorsum, throwing out an acute angular projection from the end of the cell, and includes in its area two somewhat darker discal patches and one plical patch, followed by a streak along the fold; the outer edge of this patch ascends obliquely outward from the dorsum before the tornus, and from a little beyond it the apical and terminal area is thickly bestrewed with dark umber-brown, which at intervals runs through the pale ochreous cilia, as far as their middle along the termen, and to their extremities at and above the apex. Exp. al. 24 mm. Hindwings shining, pale bone-grey; cilia pale ochreous; ♂ without subcostal hair-pencil. Abdomen cinereous. Legs cinereous, with broad, pale brownish fuscous, tarsal bands.

Type ♂ (26992); ♀ (28035) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., VI. 1894; Lihue, 4000 ft., VII. 1896. Two specimens.

This species somewhat resembles *Diplosara lignivora* Btl., from which it can be easily distinguished by the absence of raised scales and the smooth terminal joint of the palpi.

154. (18) *Hyposmocoma abjecta*, Btl. (Pl. XVIII. fig. 22).

Laverna abjecta Btl., Ann. & Mag. NH. (5. s.) VII. 404—5, No. 46 (1881)[1].

Antennae black, minutely annulate with white, a white ring around the apex of the elongate black basal joint. Palpi black, sprinkled with white scales, a white ring around the apex of the median joint; the apex of the terminal joint, which is longer than the median, white. Head hoary brownish. Thorax dark brown, with a few white scales. Forewings dark bronzy brown, with a white spot on the costa at the base, a bluish white transverse band at one-fifth, indented about the middle on its inner edge, diffused and diluted outward along the dorsum nearly to the tornus and emitting at the upper edge of the dorsal extension a short tooth-like excrescence beyond the middle; before the apex is a broad, oblique, transverse blue-white patch, narrowing inward toward the dorsum and followed on the termen by the dark ground-colour; cilia cream-white, shaded with brown along their basal half and faintly also with grey before their tips; under side lustrous, pale brassy brown, with paler cilia on which the shading, as on the upper side, is conspicuous. Exp. al. 16 mm. Hindwings shining, pale yellowish brown; cilia concolorous. Abdomen pale brownish; shining, yellowish white beneath. Legs dark brown, with white annulations on the tarsal joints.

Type ♀ (48 : 77. 43) Mus. Br.

HAB. HAWAIIA[1]. OAHU: Waianae Mts., 2000 ft., IV. 1892. Three specimens.

155. (19) *Hyposmocoma blackburnii* Btl. (Pl. XVIII. fig. 23).

Hyposmochoma blackburnii Btl., Ann. & Mag. NH. (5. s.) VII. 400, No. 38 (1881)[1].

Antennae greyish fuscous above, speckled with pale cinereous, laterally, along their basal half. Palpi pale cinereous, sprinkled and clouded with fuscous, a ring of the same around the median joint near its apex. Head olivaceous fuscous, sprinkled with pale cinereous. Thorax olivaceous fuscous, tegulae sprinkled with cinereous. Forewings yellowish olivaceous brown, a basal patch, margined with dark fuscous, angulated on the fold, has some raised fuscous scales near the dorsum; a dark fuscous patch, at a little beyond the middle of the fold, edged outwardly with whitish scales, somewhat raised, is succeeded by a dark fuscous patch at the end of the cell, another lying on the costa before it a little beyond one-third from the base; at a little beyond two-thirds the outer edge of the olivaceous brown ground-colour is slightly indented below the costa, and edged with dark fuscous scaling below the indentation; the space beyond it whitish, with olivaceous brown sprinkling about the tornus and in the region of the apex, this extends also over the costal cilia, the apical and terminal cilia being brownish ochreous, with olivaceous mottlings along their base and a slender shade-line beyond their middle. Exp. al. 12—19 mm. Hindwings tawny grey; cilia grey, with a brownish ochreous tinge; ♂ with a pale fawn-ochreous subcostal hair-pencil. Abdomen brownish grey. Legs greyish cinereous, tarsi broadly banded with greyish fuscous, the joints conspicuously whitish ochreous.

Type ♂ (123 : 81. 7) *Maui*, Mus. Br. [Caenotype ♂ (28535); ♀ (28536) Mus. Wlsm.]

Hab. Kauai: Kaholuamano, 4000 ft., iv. 1895; Halemanu, 4000 ft., v. 1896; Mts., 3000—4000 ft., v.—vi. 1894 (Perkins).—Oahu: Waianae Mts., 2000—about 3000 ft., iv. 1892: "on more or less decayed 'Koa' trunks (= *Acacia koa*)" (Perkins).—Maui: Haleakala about 4000 ft., various localities—"I think it is connected with dead wood" (Blackburn)[1]; Haleakala, below 4000—5000 ft., v. 1896; Olinda (Haleakala), 4000 ft., v. 1896 (Perkins). Fifty-seven specimens.

The species is extremely variable in colour and markings, the tendency in colour being towards brownish ochreous or fawn-brown; the obliquely placed spots tending to coalescence, the basal patch and the outer edge of the darker colouring tending to be produced outward, frequently forming a streak from the middle of the latter extending to the apex. In the females especially, which are somewhat narrower towards the apex than the males, the lighter brown colouring seems to be more frequently developed, but in a series of fifty specimens showing various intermediate gradations, and varying not inconsiderably in size, I am unable to find any permanent character by which they can be separated into two or more reliable species.

It would not be difficult to divide them into two series by measurement, the smaller form at first sight appearing on this account to be distinct, but both series exhibit the same modification of colouring and are identical in structure and it would not be safe to predict that they could be separated even in the larval stages.

Hyposmocoma sp ? (? *blackburnii* Btl.).

Hab. Molokai: 4500 ft., viii. 1893. (26402 Mus. Wlsm.)

A single specimen in very poor condition indicates that *blackburnii*, or a very closely allied species, occurs in Molokai.

Hyposmocoma sp. ? (? *blackburnii* Btl.).

Hab. Hawaii: Mt. Kilauea, vii. 1895. (27418 Mus. Wlsm.)

A single specimen, inseparable in appearance from *blackburnii*, differs in having veins 4 and 5 of the hindwings connate in one wing and short-stalked in the other. The specimen is doubtless abnormal, and being unique it might be rash to name it *blackburnii*, since no similar variation in neuration has been found in the long series from Kauai, Oahu and Maui.

156. (20) *Hyposmocoma cupreomaculata*, sp. nov. (Pl. XVIII. fig. 24).

Antennae pale fawn-ochreous, with dark brown annulations. Palpi pale fawn-ochreous, much mottled and shaded with dark brown, especially in a ring before the pale apex of the median joint and along the under side of the terminal. Head pale ochreous, mottled with dark brown; face unmottled. Thorax pale fawn-ochreous, speckled with dark brown. Forewings pale fawn-ochreous, speckled with dark brown, with conspicuous dark coppery brown patches; a small spot, at the base of the costa, indicates the upper end of a basal patch dilated outward to the dorsum and clearly defined, at its outer edge, above and below the fold; a second costal patch, a little before the middle of the wing, is followed by another at three-fifths, the latter produced and attenuated downward nearly to the fold, where it precedes a tornal spot of the same colour, tending to be connected with it by scattered scales; a larger, and more conspicuous, outwardly oblique patch arises a little above the dorsum, before the middle, and is clearly defined and dilated to the upper edge of the cell; cilia concolorous, preceded at the apex by a few bright coppery brown scales. Exp. al. 15 mm. Hindwings pale, shining, straw-grey, with a bronzy suffusion on their outer half; cilia brownish grey. Abdomen shining, pale fawn-ochreous. Legs pale fawn-ochreous, tarsi darker shaded, but with pale spots.

Type ♀ (26338) Mus. Wlsm.

Hab. Molokai: 3000 ft., 6. ix. 1893. Unique.

157. (21) *Hyposmocoma progressa*, sp. nov. (Pl. XVIII. fig. 25).

Antennae pale ochreous, with black annulations. Palpi whitish ochreous, sprinkled externally with greyish fuscous. Head whitish ochreous. Thorax pale ochreous, shaded and mottled with greyish fuscous. Forewings pale ochreous, profusely sprinkled and mottled with greyish fuscous; in the distribution of the dark shading a pattern is indicated, rather than expressed, consisting of an ill-defined basal patch bulging outward on the fold and above it, but receding to the margins; an oblique costal streak at one-fourth, with a nearly opposite dorsal streak below it; a costal shade a little beyond the middle, with an opposite dorsal shade; a patch or shade beyond the end of the cell, continued to the apex and overflowing the costal cilia, but leaving pale spots along the base of the cilia, these are reduplicated along the termen, to the number of about three in each series, being also traceable on the under side; the costal cilia are preceded by a somewhat distinct pale patch, which is matched on the dorsum opposite (the whole wing has a mottled appearance, and the indication of the markings depends entirely upon the amount of suffusion which may occur in different specimens); apical and dorsal cilia greyish fuscous, terminal cilia pale ochreous. Exp. al. 14 mm. Hind-wings and cilia bronzy fuscous. Abdomen dark greyish fuscous. Legs greyish fuscous above, with paler tarsal spots.

Type ♀ (28503) Mus. Wlsm.

HAB. MAUI: Haleakala, below 4000 ft., v. 1896. Two specimens.

Closely allied to *blackburnii* Btl., (which also occurs in Maui), but exhibiting a very different general design of colouration.

158. (22) *Hyposmocoma domicolens*, Btl.

Laverna domicolens Btl., Ann. & Mag. NH. (5. s.) VII. 405—6, No. 48 (1881)[1].

158ᵃ. (22ᵃ) *domicolens* Btl. + *domicolens* Btl. (Pl. XVIII. fig 26).

Antennae whitish ochreous, faintly annulate with brown, a large brownish fuscous spot on the basal joint. Palpi whitish ochreous, with a brownish fuscous shade along the basal half of the median joint externally, and a spot of the same colour before its apex; the extreme base of the terminal joint is also narrowly brownish fuscous. Head whitish ochreous. Thorax brownish fuscous, speckled with whitish ochreous; tegulae whitish ochreous, with a brownish fuscous spot at their base. Forewings whitish ochreous, with a dark umber-brown shade from the base extending along the dorsum and on the cell to beyond the middle of the wing, this is somewhat mottled with the pale ground-colour, but assumes a darker shade at the base of the dorsum, where there are a few brownish fuscous scales projecting along the fold, and in a pointed spot at the end of the cell (in some varieties the ground-colour is bone-white, the markings tending to split up into separate spots with a greater or less degree of suffusion on the wing-surface; the suffusion in some specimens being confined to the region above the fold, while in others the costal portion is quite free from it, the shading following the line of the fold and reaching to the apex after angulation downward to the tornus); two narrow elongate costal spots, one at the base, another at one-third, precede a slightly sinuate transverse band of dark umber-brown at two-thirds the wing-length (this band is often more or less broken on the cell), the same colour appearing again in a series of marginal spots around the apex at the base of the whitish ochreous cilia through which they partly run. Exp. al. 14—18 mm. Hindwings pale grey, with a bronzy brownish tinge around the margins which overflows the brownish ochreous cilia, except at the extreme base, where they are nearly white; ♂ with a whitish ochreous subcostal hair-pencil. Abdomen bronzy brownish, varying to lustrous whitish. Legs whitish ochreous, tarsi spotted with fuscous.

Type ♂ (124: 81. 7) Mus. Br. [Caenotypes ♂ (25483); ♀ (25414); ♂ (25585); ♂ (25218); ♀ (25411) *Hawaii*, Mus. Wlsm.]

HAB. MOLOKAI: above 3000—above 4000 ft., 5. VI.—12. VII. 1893 (Perkins).—LANAI: 2000 ft., I.—II. 1894 (Perkins).—MAUI: Makawao, 2000 ft. (Blackburn)[1].—HAWAII: Kona, 2000—3000 ft., VI. 1892, 3500 ft., 26.—29. VI. 1892, above 4000 ft., VII. 1892, 17. VIII.—8. IX. 1892, 2000—3000 ft., IX. 1892; Kaawaloa (Kona), 1500 ft., VI. 1892, above 2000 ft., IX. 1892; Mt. Kilauea, VII.—VIII. 1895 (Perkins). Forty-two specimens.

158^b. (22^b) *domicolens* Btl. + *suffusa*, var. nov. (Pl. XVIII. fig. 27).

This species is extremely variable and I must include with it yet another series in which the wings are entirely suffused with fawn-grey, the markings being almost, or quite, obliterated. Where these are traceable they agree precisely in position with those of the more typical form but no marginal spots are visible.

Type ♂ (27383); ♀ (27419) *Hawaii*, Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (1) X. 1895.—HAWAII: Kona, about 3000 ft., (2) 29. VI. 1892; Mt. Kilauea, (6) VII. 1895. Nine specimens.

159. (23) *Hyposmocoma lupella*, sp. nov.

159^a. (23^a) *lupella*, sp. nov. + *lupella*, var. nov. (Pl. XVIII. fig. 28).

Antennae dark brown, annulate with pale ochreous; basal joint whitish ochreous, annulate with brown. Palpi whitish ochreous, the median joint shaded with brown on its basal half, the terminal joint sprinkled with brown scales. Head whitish ochreous, almost white. Thorax whitish ochreous; patagia and base of tegulae dark brown. Forewings whitish ochreous, with a broad dark brown shade from the base, extending with a sprinkling of the pale ground-colour along the costa to two-thirds, crossing the fold near the base, but not quite reaching the dorsum, and again before the middle almost reaching the dorsum, its outer edge very oblique and somewhat irregular; a narrow reduplicated brown patch before the tornus, extending through the cilia, and above it a small dark brown spot at the end of the cell; the apex of the wing is sparsely suffused with brown scales, confluent in small costal spots and in an apical spot extending through the cilia; terminal cilia whitish ochreous. Exp. al. 13—17 mm. Hindwings grey; cilia with a brownish tinge; ♂ with a whitish ochreous subcostal hair-pencil. Abdomen brownish grey. Legs pale ochreous, with brownish grey tarsal spots.

Type ♂ (27872); ♀ (27641) Mus. Wlsm.

Hab. Kauai: Kaholuamano, 4000 ft., (10) iv. 1895; Mts., 3000—4000 ft., (1) v. 1894, (7) vi. 1894. Eighteen specimens.

159^b. (23^b) *lupella* Wlsm. + *suffusella*, var. nov. (Pl. XIX. fig. 1).

Forewings with the whole basal two-thirds suffused with brown, with the exception of a narrow space along the limbus and a more or less distinct whitish costal triangle. Exp. al. 12—16 mm. Palpi tending to be suffused with brown; median joint with a short pale band at its apex.

Type ♂ (26202); ♀ (26137) *Molokai*, Mus. Wlsm.

Hab. Kauai: Kaholuamano, 4000 ft., (3) iv. 1895; Mts., 3000—4000 ft., (2) vi. 1894.—Oahu: Waianae Mts., 2000—3000 ft., (3) iv. 1892.—Molokai: above 3000 ft., (3) 5.—13. vi. 1893.—Maui: Haleakala, 5000 ft., (3) iii. 1894. Fourteen specimens.

159^c. (23^c) *lupella* Wlsm. + *candidella*, var. nov. (Pl. XIX. fig. 2).

Forewings with the ground-colour clearer white, which colour is usually displayed in a costal patch near the base, but in some few specimens this is almost entirely overspread by the darker shade which also reaches the dorsum as far as the middle, leaving the limbus narrowly white. Exp. al. 12—16 mm. Palpi usually coloured only at the base of the median joint and not beyond the middle.

Type ♂ (25773); ♀ (25385) *Hawaii*, Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., (3) vi. 1894.—Molokai: above 3000 ft., (3) 30. v.—12. vi. 1893.—Lanai: 2000 ft., (1) vii. 1894.—Maui: Haleakala, below 4000—5000 ft., (2) v. 1896.—Hawaii: Halemanu, 4000 ft., (1) v. 1896; Mt. Kilauea, (2) vi.—vii. 1895; Kona, 5000 ft., (1) 30. vi. 1892, above 4000—5000 ft., (4) 4. vii. 1892, 4000 ft., (3) vii. 1892, above 4000 ft., (1) viii. 1892, 4000 ft., (1) 9. ix. 1892, (4) ix. 1892; Hualalai (Kona), 5000 ft., (3) 5. viii. 1892. Twenty-nine specimens.

It is noticeable that the variety *lupella*, having the white of the outer portion of the wing continued along the dorsum to the base, is confined to Kauai, where it is somewhat exceptional to meet with the varieties having the dark shade reaching to the dorsum.

In the variety *suffusella* the darker colour tends to suffuse the palpi as well as the forewings, while in *candidella* the white predominates on the palpi and on the wings.

160. (24) *Hyposmocoma mediella*, sp. nov. (Pl. XIX. fig. 3).

Antennae cream-colour, barred above with dark brown. Palpi slender, evenly recurved; whitish, shaded with fuscous at the base. Head and Thorax whitish. Forewings pale, glossy, cream-ochreous, with a dark bronzy brown spot at the base of the costa, partially connected with a broad median streak of the same colour commencing near the base, dilated outward and diffused obliquely upward toward the costa from a little beyond the middle; beyond the end of the cell are two bronzy brown spots, forming an equilateral triangle with another at the tornus; cilia whitish ochreous. Exp. al. 11—12 mm. Hindwings and cilia greyish brown; ♂ with a greyish subcostal hair-pencil. Abdomen greyish brown. Legs whitish ochreous, banded with greyish brown shading.

Type ♀ (25067); ♂ (25069) Mus. Wlsm.

HAB. OAHU: Waianae Mts., IV. 1892. Six specimens.

161. (25) *Hyposmocoma sabulella*, sp. nov. (Pl. XIX. fig. 4).

Antennae pale sandy ochraceous, barred above with fawn-brown, the basal joint shaded above and beneath with brownish fuscous. Palpi pale ochreous, the median joint shaded externally along the basal half and spotted near its outer end with brownish fuscous; the terminal joint with a brownish fuscous ring at the base. Head and Thorax whitish ochreous; tegulae dark fawn-brown. Forewings sandy ochraceous, with a dark fawn-brown shade commencing at the base of the costa, spreading nearly to the dorsum, and extending outward along the fold, but not along the costa, and suffusing the outer half of the cell to its abrupt termination at the discoidal vein where it reaches both margins; cilia pale sandy ochraceous. Exp. al. 15 mm. Hindwings shining, pale yellowish grey; cilia sandy ochraceous; ♂ with ochreous subcostal hair-pencil. Abdomen brownish. Legs sandy ochraceous.

Type ♀ (27566); ♂ (27567) Mus. Wlsm.

HAB. KAUAI: Halemanu, 4000 ft., v. 1895. Four specimens.

162. (26) *Hyposmocoma albifrontella*, sp. nov. (Pl. XIX. fig. 5).

Antennae pale brownish ochreous, the basal joint blackish. Palpi white, with a black streak at the base and a black spot at the apex of the median joint externally, also a black ring before the apex of the terminal joint. Head and Thorax snow-white. Forewings very pale brownish ochreous, with a dark brown streak from the base extending to two-thirds along the dorsum, covering the subplical space and crossing the fold near its base, but not at its outer extremity, above which is a brown costal spot preceded by a smaller one half-way between it and the base, and a faint indication of brown scale-groups about the end of the cell; cilia pale brownish ochreous. Exp. al. 14 mm. Hindwings shining, pale grey; cilia pale cinereous, with a slight ochreous tinge; ♂ without subcostal hair-pencil. Abdomen pale cinereous, with a slight ochreous tinge. Legs whitish cinereous, tarsi broadly banded with dark brown.

Type ♂ (26229) Mus. Wlsm.

HAB. MOLOKAI: about 4000 ft., VI. 1893. Unique.

163. (27) *Hyposmocoma humerovittella*, sp. nov. (Pl. XIX. fig. 6).

Antennae pale brownish ochreous, the basal joint fuscous. Palpi whitish ochreous, with a fuscous patch on the basal half of the median joint externally and a spot near the end of the joint; the terminal joint marked with fuscous at the base and apex. Head and Thorax whitish ochreous, the base of the tegulae fuscous. Forewings whitish ochreous, shaded with fawn-brown along the middle of the dorsum; a broad dark brownish fuscous streak extends from the base along the costa to the middle, and is followed by a small costal spot of the same at two-thirds from the base; opposite to this is a dorsal spot about the tornus, preceded by two smaller ones, one at the outer third of the fold, the other above and beyond it on the disc; a few fuscous marginal scales, at and below the apex, before the base of the whitish ochreous cilia, which are shaded through their middle and at the tornus with fawn-grey. Exp. al. 15 mm. Hindwings and cilia brownish grey; ♂ without subcostal hair-pencil. Abdomen brownish grey above, whitish ochreous at the sides. Legs whitish ochreous, the tarsi broadly banded with brownish grey.

Type ♂ (25088) Mus. Wlsm.

HAB. OAHU: Waianae Mts., 3000 ft., IV. 1892, "beaten from dead branches." Unique.

164. (28) *Hyposmocoma cincta*, sp. nov.

164^a. (28^a) *cincta*, sp. nov. + *cincta*, var. nov. (Pl. XIX. fig. 7).

Antennae whitish ochreous, barred above with umber-brown, basal joint umber-brown above nearly to its apex. Palpi whitish ochreous, the median joint shaded externally with umber-brown. Head and Thorax whitish ochreous, the base of the tegulae brown. Forewings whitish ochreous, the costa and dorsum suffused throughout with umber-brown which overflows the outer half of the wing; cilia whitish ochreous. Exp. al. 14 mm. Hindwings shining, steel-grey; cilia grey. Abdomen dark grey. Legs whitish ochreous, shaded with grey above.

Type ♀ (27555) Mus. Wlsm.

HAB. KAUAI: Halemanu, 4000 ft., V. 1895. Unique.

164^b. (28^b) *cincta* Wlsm. + *adjacens*, var. nov. (Pl. XIX. fig. 8).

A cloudy, more ochreous variety, may possibly prove to be distinct. Exp. al. 14 mm.

Type ♀ (27335) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., VI. 1894. Unique.

165. (29) *Hyposmocoma mediospurcata*, sp. nov. (Pl. XIX. fig. 9).

Antennae whitish ochreous, barred above with dark brown. Palpi whitish ochreous, shaded at the base and near the apex of the median joint, also near the base of the terminal joint with dark brown. Head whitish ochreous. Thorax dark brown, mixed with ochreous, the tegulae ochreous. Forewings whitish ochreous, with a dark brown streak running from the base of the costa along the line of the cell to the apex; two elongate patches of the same colour, one before and one beyond the middle, the latter diffused downward to the central streak; along the dorsum, below the fold, is a sprinkling of dark brown scales ending in a thicker patch at the end of the fold; cilia whitish ochreous. Exp. al. 13—15 mm. Hindwings rather pale brownish grey; cilia pale brownish ochreous; ♂ with a whitish ochreous subcostal hair-pencil. Abdomen dark greyish; whitish ochreous beneath. Legs whitish ochreous, the tarsi broadly banded with dark brown.

Type ♂ (28108); ♀ (28107) Mus. Wlsm.

HAB. HAWAII: Kona, 4000 ft., (1) VII. 1892; 3000 ft., (1) IX. 1892; Mt. Kilauea, (3) VII. 1895, (2) VIII. 1896; Hilo, 2000 ft., (1) XII. 1895. Eight specimens.

166. (30) *Hyposmocoma tripartita*, sp. nov. (Pl. XIX. fig. 10).

Antennae white, annulate with light brown; basal joint light brown, with a white annulus at the apex. Palpi white, median joint shaded with brown externally, the terminal joint sprinkled with brown and shaded before the apex. Head and Thorax fawn-brown above, with a white streak on either side continued backward along the upper edge of the tegulae; face white. Forewings with the costa and dorsum broadly rich fawn-brown, a white band of the same width along the middle, touching the costa at its extreme base, and separated from the cilia by a slender brown line; the white has a tendency to encroach upon the dorsal band in two inwardly oblique tooth-like projections beyond the middle, not clearly defined; cilia white, tinged with brown at and above the apex and at the tornus, terminal cilia with a broken brownish line along their middle. Exp. al. 14—15 mm. Hindwings and cilia rather shining, grey; ♂ with pale grey subcostal hair-pencil. Abdomen whitish, tinged with grey at the base above. Legs whitish, tibiae with greyish hairs above, the tarsi ringed with grey shading.

Type ♂ (26090) Mus. Wlsm.

HAB. MOLOKAI: 4000 ft., VI. 1893; 4500 ft., 17. IX. 1893; forest above Pelekunu, 21. IX. 1893. Three specimens.

167. (31) *Hyposmocoma thoracella*, sp. nov. (Pl. XIX. fig. 11).

Antennae whitish, broadly barred above with brown. Palpi whitish, the median joint smeared and spotted near the apex externally with bronzy brown, the terminal joint with a spot of the same at its base. Head white. Thorax white, margined with bronzy brown at the sides. Forewings bronzy brown, with a broad white streak from the middle of the base to the end of the cell, diffused thence upward to the costa and outward to the apex, where it is sprinkled with bronzy brown; a slight projection from the brown dorsal area encroaches on the white median streak at the commencement of the outer third of the fold; cilia greyish, obscurely streaked with bronzy brown. Exp. al. 13 mm. Hindwings and cilia pale brownish grey; subcostal hair-pencil in the ♂ pale grey. Abdomen brownish grey. Legs greyish, tarsi faintly annulate.

Type ♂ (26459); ♀ (26457) Mus. Wlsm.

HAB. LANAI: 2000 ft. and above, I.—II. 1894. Three specimens.

This species differs from *H. tripartita* in the white head and thorax, and in the darker hue of the brown marginal colouring of the forewings.

168. (32) *Hyposmocoma limata*, sp. nov. (Pl. XIX. fig. 12).

Antennae greyish brown, basal joint white beneath. Palpi white, with a brown streak at the base of the median joint externally. Head and Thorax silvery white, the base of the tegulae bronzy brown. Forewings silvery white, with a broad bronzy brown band along the costa from base to apex and an elongate dorsal patch of the same colour before the tornus; cilia silvery, with a slight golden gloss. Exp. al. 15 mm. Hindwings dark brownish grey; cilia grey; ♂ without subcostal hair-pencil. Abdomen brownish fuscous. Legs whitish, the hairy hind tibiae grey above, the tarsi shaded with grey externally.

Type ♂ (27486) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VII. 1895. Unique.

169. (33) *Hyposmocoma sublimata*, sp. nov. (Pl. XIX. fig. 13).

Antennae brownish fuscous. Palpi shining, creamy whitish, terminal joint and outer side of median shaded with fuscous. Head brownish fuscous; face creamy white. Thorax brownish fuscous; tegulae cream-white. Forewings cream-white along the middle, with a broad brownish fuscous costal shade extending from the base to the apex, this is attenuated at the extreme base of the costa; a corresponding dorsal shade, extending from the base to the tornus, is diluted upward along the termen, thus connected with the costal shade by only a few scattered scales; at the lower edge of the costal shade, a little before the wing-middle, a small darker spot is faintly indicated, and this is followed by a conspicuous blackish spot at the end of the cell, connected at its upper edge with the costal shade; cilia pale brownish fuscous. Exp. al. 14 mm. Hindwings shining, grey; cilia dull brownish grey. Abdomen slaty grey. Legs brownish grey, with pale tarsal spots.

Type ♀ (28366) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., v. 1896. Unique.

170. (34) *Hyposmocoma advena*, sp. nov. (Pl. XIX. fig. 14).

Antennae bronzy brown. Palpi pale ochreous, shaded externally with bronzy brown at the extreme base and along the terminal joint. Head pale ochreous, a few bronzy brown scales on the crown. Thorax bronzy brown, tegulae pale ochreous. Forewings bronzy brown, with a broad pale ochreous streak from the base to three-fourths, including the fold, except at its outer end, and leaving the dark colour wider on the costal than on the dorsal margin; beyond it a semi-detached pale ochreous streak runs to the termen and includes the terminal cilia; cilia bronzy brownish. Exp. al. 12 mm. Hindwings brownish grey; cilia bronzy brownish. Abdomen brownish fuscous. Legs brownish fuscous, tarsi spotted with pale ochreous, spurs pale ochreous.

Type ♀ (26091) Mus. Wlsm.

HAB. MOLOKAI: 4000 ft., VI. 1893. Unique.

The broad ochreous streak sufficiently distinguishes this from all other species in the group except *subflavidella* ♀. The specimen is unfortunately unique, but the shape of the median streak, its abrupt termination above the tornus without diminution of its width, and the consequently narrower costal area overspread by the dark ground-colour, gives it a very different appearance. One would expect this species to be sexually dimorphic as is the case with *subflavidella*, and should a series of specimens be obtained from Molokai it will probably exhibit an illustration of close parallelism rather than of special identity.

171. (35) *Hyposmocoma subflavidella*, sp. nov. (Pl. XIX. fig. 15).

Antennae fuscous. Palpi ochreous, tipped with fuscous and smeared with fuscous externally. Head, ♂ bright yellowish ochreous: ♀ whitish ochreous. Thorax, ♂ bright yellowish ochreous, with a smoky fuscous median patch, the base of the tegulae smoky fuscous: ♀ purplish fuscous, the tegulae tipped with whitish ochreous, but exceptionally these are suffused with the darker colour. Forewings, ♂ pale straw-ochreous, blending to bright yellowish ochreous on the terminal area and on the apical and terminal cilia; with a broad smoky fuscous band along the costa from base to apex, fully one-third the wing-width; costal cilia smoky fuscous, mixed with ochreous, tornal cilia fuscous; under side dark fuscous, cilia as above: ♀ purplish fuscous, with a single, rather broad whitish ochreous streak along the fold, abruptly terminated before the tornus; the costa very narrowly tinged with whitish ochreous beyond the basal third; terminal cilia bright ochreous, at the extreme apex and about the tornus tawny grey (in some varieties the pale plical streak is obliterated by a suffusion of the darker colour). Exp. al. 11—14 mm. Hindwings fuscous; cilia tawny fuscous; ♂ without subcostal hair-pencil. Abdomen dark fuscous. Legs greyish.

Type ♂ (28241); ♀ (26595) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., (7) III. 1894, (2) IV. 1894, (17) V. 1896; Olinda (Haleakala), 4000 ft., (2) IV. 1894. Twenty-eight specimens.

172. (36) *Hyposmocoma auroargentea*, sp. nov. (Pl. XIX. fig. 16).

Antennae whitish, much shaded with mouse-grey above. Palpi whitish, terminal joint mouse-grey. Head silvery whitish. Thorax silvery, with some mouse-grey shading. Forewings shining, silvery white, with a mouse-grey shade from the base below the costa, extending beyond one-third; a narrower mouse-grey shade along the outer half of the cell, ending in a spot at the end of the cell, and a narrow mouse-grey shade along the fold throughout its length; cilia golden yellow, greyish about the tornus; under side dark leaden grey, costal and terminal cilia ochreous, tornal cilia dark grey. Exp. al. 15—16 mm. Hindwings and cilia leaden grey; ♂ without subcostal hair-pencil. Abdomen dark leaden grey. Legs greyish cinereous.

Type ♂ (28402); ♀ (28318) Mus. Wlsm.

HAB. MAUI: Haleakala, above 5000 ft., III. 1894; 5000 ft., V. 1896. Four specimens.

A variety of *Neelysia lignicolor* may easily be confused with this species, but can be at once separated by the absence of a vein in the forewings.

173. (37) *Hyposmocoma illuminata*, sp. nov. (Pl. XIX. fig. 17).

Antennae dark umber-brown. Palpi pale yellowish ochreous, with a dark brown streak externally on the basal half of the median joint; terminal joint shaded beneath and tipped with dark brown. Head pale yellow-ochreous. Thorax bright orange-ochreous. Forewings, ♂ silvery white, with a narrow, diffused, dark umber-brown streak at the base of the costa, reaching to about one-third along it; this is margined at its lower edge by a dash of bright ochreous, the same colour extending also along the limbus; costal, apical and terminal cilia bright orange-ochreous, tornal cilia brownish grey; under side dark, shining, fuscous, cilia ochreous, brownish grey at the tornus: ♀ dull ochreous, more or less suffused with brownish scales, especially along the costal portion of the wing; cilia brownish grey, terminal cilia ochreous along their basal half. Exp. al. 13—14 mm. Hindwings dark tawny grey; cilia dark tawny grey, with a brownish tinge; ♂ with subcostal hair-pencil. Abdomen dark tawny brown. Legs, ♂ hind tibiae whitish cinereous, with long tawny hairs above; the tarsi faintly shaded with tawny grey: ♀ smoky brownish fuscous.

Type ♂ (28384); ♀ (28250) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., (5) III. 1894, (3) IV. 1894, (6) V. 1896. Fourteen specimens.

174. (38) *Hyposmocoma auripennis*, Btl. (Pl. XIX. fig. 18).

Gracilaria auripennis Btl., Ann. & Mag. NH. (5. s.) VII. 404, No. 45 (1881)[1].

Antennae, ♂ pale ochreous, faintly banded above with greyish fuscous, the basal joint streaked above and below with the same; ♀ banded with blackish, more distinctly than in the ♂. Palpi whitish, with a slight ochreous tinge. Head and Thorax rich yellow-ochreous; the face slightly paler, shining; the bases of the tegulae fuscous. Forewings and cilia rich yellow-ochreous, the colour slightly intensified on the costa towards the apex, on the termen and on the cilia; a small fuscous spot on the costa at the extreme base; under side shining, greyish fuscous, the costa narrowly ochreous, cilia bright ochreous. Exp. al. 13—17 mm. Hindwings and cilia tawny grey, costal cilia pale yellowish cinereous; ♂ without subcostal hair-pencil. Abdomen dark fuscous, anal tuft paler. Legs whitish ochreous, the upper sides of the tibiae greyish.

Type ♂ (121 : 81. 7) Mus. Br. [Caenotype ♂ (28270); ♀ (28431) Mus. Wlsm.]

HAB. MAUI: Haleakala (Blackburn)[1]; Haleakala, 5000 ft., V. 1896 (Perkins); Olinda (Haleakala), 4000 ft., V. 1896 (Perkins). Thirteen specimens.

175. (39) *Hyposmocoma rhabdophora*, sp. nov. (Pl. XIX. fig. 19).

Antennae whitish ochreous, barred above with brownish fuscous, the basal joint fuscous above nearly to its apex. Palpi whitish ochreous, with a broad brownish fuscous streak along the outer side of the median joint, reaching to or beyond its middle, and followed by a patch of the same before its apex; the terminal joint also shaded with fuscous at its base externally. Head and Thorax pale yellow-ochreous; tegulae fuscous at their base. Forewings bright yellowish ochreous, with a strong brownish fuscous streak along the costa from base to two-fifths; cilia yellow-ochreous, tipped with grey about the tornus; under side pale, shining, greyish fuscous, cilia pale ochreous. Exp. al. 15 mm. Hindwings shining, brownish grey; cilia brownish grey, tinged with ochreous around the extreme apex; ♂ without subcostal hair-pencil. Abdomen dark brownish grey, anal segment ochreous. Legs whitish cinereous.

Type ♀ (26328) Mus. Wlsm.

HAB. MOLOKAI: above 4000 ft., 17. IX. 1893. Unique.

A ♂ in poor condition (26097) taken in the same island at about 4000 ft., VI. 1893, appears to belong to an earlier brood of this species; the antennae are greyish brown, the palpi pale ochreous, scarcely shaded at the base externally. Exp. al. 10 mm.

The ornamentation of the palpi, the greater extension of the dark streak on the costa of the forewings, and their paler colouring, with less contrasted cilia and costa on the under side, will at once separate this species from *auripennis*, Btl.

176. (40) *Hyposmocoma costimaculata*, sp. nov. (Pl. XIX. fig. 20).

Antennae pale ochreous, annulate with black. Palpi whitish ochreous. Head very pale ochreous. Thorax yellow-ochreous. Forewings and cilia yellow-ochreous, a short black streak along the base of the costa; small plical and disco-terminal dots are indicated, also a discal, a little beyond the plical, and two costal, one before and one beyond the middle (in some specimens the spots are scarcely distinguishable). Exp. al. 10 mm. Hindwings and cilia grey; ♂ without subcostal hair-pencil. Abdomen dark grey above, whitish beneath. Legs whitish ochreous, tarsi conspicuously annulate with black.

Type ♂ (26207); ♀ (26179) Mus. Wlsm.

HAB. MOLOKAI: above 3000 ft., (7) 30. V. 1893, (1) 16. IX. 1893. Eight specimens.

The single ♀ varies in having the antennae more distinctly annulate, but the spots on the wings are almost obliterated.

177. (41) *Hyposmocoma virgata*, sp. nov. (Pl. XIX. fig. 21).

Antennae pale ochreous, annulate with dark fuscous. Palpi pale ochreous. Head orange-ochreous, the face paler. Thorax orange-ochreous, with a fuscous median spot, the base of the tegulae fuscous. Forewings bright orange-ochreous, spotted with dark purplish fuscous; an elongate narrow patch at the base of the costa is depressed at its apex, nearly meeting, on the fold, a narrow streak of the same colour arising from the dorsum near the base; this is followed by a narrow costal spot at one-third, another costal spot occurring at two-thirds, being the upper one of a series of three running obliquely backward, the lower one lying on the dorsum scarcely before the middle; the apical and terminal portion of the wing is mottled with purplish fuscous, extending inward in the middle to the end of the cell; cilia dark purplish fuscous at the apex, orange-ochreous below it, and tawny grey towards the tornus. Exp. al. 12—14 mm.

Hindwings dark bronzy grey; cilia tawny grey; ♂ without subcostal hair-pencil. Abdomen dark tawny grey. Legs, hind tibiae and tarsi banded alternately with pale ochreous and tawny fuscous.

Type ♀ (26094); ♂ (26231) *Molokai*, Mus. Wlsm.

HAB. MOLOKAI: about 4000 ft., (5) 22. V.—VI. 1896.—MAUI: Haleakala, 5000 ft., (12) V. 1896. Seventeen specimens.

Somewhat variable in the intensity of the dark markings, the tendency being towards obliteration in the ♂.

178. (42) *Hyposmocoma bilineata*, sp. nov. (Pl. XIX. fig. 22).

Antennae pale ochreous, distinctly annulate with tawny fuscous. Palpi whitish ochreous, without markings. Head pale ochreous, face whitish ochreous. Thorax bright ochreous. Forewings bright orange-ochreous, with two distinct tawny fuscous streaks running through them; the first, commencing at the base of the costa, overflowing the costa itself for a short distance, thence slightly attenuated outward to the end of the cell and continued to the apex, but not through the terminal cilia; the second, beginning at the flexus, is continued along the dorsum to the tornus where it affects the colouring of the dorsal cilia; the other cilia are bright ochreous, fading to pale ochreous. Exp. al. 12 mm. Hindwings shining, tawny greyish; cilia dull tawny brownish grey; ♂ without subcostal hair-pencil. Abdomen dark tawny greyish fuscous; anal tuft, sides and under side shining silvery. Legs silvery whitish, with some greyish tarsal bands and a shade on the hairy upper side of the hind tibiae.

Type ♂ (25963); ♀ (25967) Mus. Wlsm.

HAB. OAHU: Waianae Mts., 2000—3000 ft., IV. 1892. Ten specimens.

179. (43) *Hyposmocoma haleakalae*, Btl. (Pl. XIX. fig. 23).

Chrysoclista (?) *haleakalae* Btl., Ann. & Mag. NH. (5. s.) VII. 407, No. 51 (1881)[1].

Antennae greyish fuscous. Palpi, median joint pale ochreous, externally shaded with fuscous, terminal joint greyish fuscous. Head ochreous, shaded with greyish fuscous, the face paler. Thorax greyish fuscous; tegulae pale ochreous, shaded with greyish fuscous on the margins. Forewings bright orange-ochreous, with a broad costal shade of tawny greyish fuscous extending to three-fourths, scarcely interrupted at the middle of the wing by a few ochreous scales; this shade is very dark at the base and is diluted and diffused outwardly, widening to the end of the cell and continued thence along the middle to the apex, leaving the margins of the bright ground-colour, with the exception of the costal cilia; a corresponding dorsal streak also starts from the base and is attenuated to the tornus, but of equal intensity throughout, a few scales at its outer extremity also connect this with the end of the cell; dorsal cilia tawny greyish fuscous, the other cilia, except on the costa about the apex, bright orange-ochreous. Exp. al. 15 mm. Hindwings dark greyish fuscous; cilia tawny greyish fuscous; ♂ without subcostal hair-pencil. Abdomen dark greyish fuscous. Legs fuscous.

Type ♀ (126: 81. 7) Mus. Br. [Caenotype ♂ (28428) Mus. Wlsm.]

HAB. MAUI: Haleakala, above 4000 ft. (Blackburn)[1]; 5000 ft., v. 1896 (Perkins).

180. (44) *Hyposmocoma lucifer*, sp. nov. (Pl. XIX. fig. 24).

Antennae bronzy brownish. Palpi, median joint ochreous, shaded with bronzy brown externally; terminal joint scarcely as long as the median, bronzy brown, with an ochreous line along its inner side. Head greyish, with some ochreous scales at the side; face grey. Thorax bronzy brown, with some whitish ochreous scales on the tegulae. Forewings bronzy brown, with a narrow pale ochreous costal streak, commencing near the base and running to beyond the middle, somewhat dilated at the middle; a broad pale ochreous streak commences with the costal cilia and is attenuated along the costa to the apex; another line of the same colour runs from the base along the fold and is continued, with a slight interruption at the end of the fold, along the base of the terminal cilia to below the apex; cilia dark tawny cinereous. Exp. al. 16 mm. Hindwings dark brownish; cilia dark tawny cinereous. Abdomen brownish fuscous. Legs cinereous.

Type ♀ (26064) Mus. Wlsm.

HAB. MOLOKAI: above 4000 ft., VI. 1893. Unique.

Closely allied to *haleakalae* Btl., the ♂ is at present unknown.

181. (45) *Hyposmocoma evanescens*, sp. nov. (Pl. XIX. fig. 25).

Antennae dark brownish grey. Palpi brownish grey, darker externally, a pale ring at the apex of the median joint. Head shining, pale brassy grey, face slightly paler. Thorax brassy grey. Forewings brassy grey, with a brownish fuscous suffusion along the base of the costa and along the line of the discal cell, whence it is dilated outward and somewhat darkened to the apex and termen; cilia brassy grey, smoky fuscous about the tornus. Exp. al. 13—14 mm. Hindwings dark bronzy fuscous; cilia smoky fuscous; ♂ without subcostal hair-pencil. Abdomen fuscous. Legs fuscous, with paler tarsal spots.

Type ♂ (28378); ♀ (26642) Mus. Wlsm.

HAB. MAUI: Haleakala, above 5000 ft., (1) III. 1894, 5000 ft., (4) v. 1896. Five specimens.

The markings on the forewings are so slight and so much blended with the general ground-colour as to be scarcely traceable in any recognisable pattern, or even distinguishable, except by carefully changing the angle of incidence, when looking at them in a good light. This species could be compared with *straminella* and *impunctata*, but is at once separated by the absence of the subcostal hair-pencil.

182. (46) *Hyposmocoma ferricolor*, sp. nov. (Pl. XIX. fig. 26).

Antennae pale cinereous, annulate with pale brownish fuscous. Palpi pale brownish ochreous, with a fuscous ring near the end of the median joint; terminal joint shaded with fuscous. Head and Thorax brownish fuscous, mixed with brownish ochreous scales; face brownish ochreous. Forewings ferruginous brown, shaded with brownish fuscous, especially along the costa, to three-fourths, a patch near the end of the cell and in the fold below it, rather more distinctly ferruginous, with a small spot of the same at the end of the cell; this slight change of colour appears to be an indication of the plical and two discal spots which are not otherwise recognisable; cilia brownish ferruginous, shading to greyish fuscous about the tornus. Exp. al. 16 mm. Hindwings and cilia dark greyish, the latter with a tawny tinge. Abdomen greyish fuscous. Legs pale greyish fuscous.

Type ♀ (25850) Mus. Wlsm.

Hab. HAWAII: Hualalai (Kona), 5000 ft., 5. VIII. 1892. Unique.

It is within the bounds of possibility that this may be a mere variety of *domicolens* Btl., but it is the only specimen exhibiting this particular shade of colour and there is no sufficient indication of the direction of the markings to justify its inclusion in the series.

183. (47) *Hyposmocoma impunctata*, sp. nov. (Pl. XIX. fig. 27).

Antennae pale fawn, with fawn-brown annulations. Palpi pale fawn. Head and Thorax pale fawn, the latter shaded along the middle with fawn-brown. Forewings pale fawn, sprinkled with fawn-brown, with a darker shade of the same, tending to brownish fuscous, commencing at the base of the costa, where it is diffused outwardly and following the cell, whence it extends to the apex, terminating in a dark spot on the basal half of the apical cilia; similar spots are indicated above and beneath it on the costa and termen; thus the main feature of the pattern consists of a dark streak running through a pale wing, but the sprinkling of dark scales, almost amounting to suffusion, terminates somewhat abruptly about the end of the cell, suggesting a costal and dorsal pale patch similar to that which occurs in other species, especially in many forms of *blackburnii* Btl., but there is no indication of a basal patch, a character which would place it in the group of *straminella*. Exp. al. 15 mm. Hindwings grey; cilia brownish grey; ♂ with pale ochreous subcostal hair-pencil. Abdomen slaty grey. Legs pale fawn, with greyish tarsal bands.

Type ♂ (27496) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VII. 1895. Unique.

This species differs from *blackburnii* Btl., in the absence of all indication of the discal spots.

184. (48) *Hyposmocoma straminella*, sp. nov. (Pl. XIX. fig. 28).

Antennae shining, straw-white, with a greyish brown spot on the basal joint, and very faint bands of the same on the basal half of the stem above. Palpi, terminal joint shorter than median; straw-white, with a greyish brown ring near the end of the median joint. Head greyish brown; face white. Thorax greyish brown; tegulae straw-white. Forewings shining, straw-white, with a greyish brown shade from the base along the discal cell, somewhat dilated beyond it and passing through the cilia at and above the apex; cilia straw-whitish, shaded with brown, especially about the tornus. Exp. al. 13—15 mm. Hindwings brownish grey; cilia greyish brown; ♂ with a stramineous subcostal hair-pencil. Abdomen brownish grey. Legs greyish, tarsi shining, whitish.

Type ♀ (25409); ♂ (25528) Mus. Wlsm.

HAB. HAWAII: Kona, 3500—4000 ft., 26. VI.—20. VII. 1892, (1) 10. VIII. 1892. Twelve specimens.

185. (49) *Hyposmocoma metallica*, sp. nov. (Pl. XX. fig. 1).

Antennae shining, bronzy fuscous. Palpi brassy, rust-brownish on their outer sides. Head rich rust-brown above, with a strong purplish sheen between the antennae; face brassy ochreous. Thorax cupreous. Forewings bronzy cupreous, the dorsal half paler than the costal, the tints blending, but not defined; cilia cupreous. Exp. al. 12—13 mm. Hindwings and cilia bronzy purplish fuscous; ♂ without subcostal hair-pencil. Abdomen blackish (probably purplish when fresh). Legs cupreous, tarsi brassy ochreous.

Type ♂ (25753); ♀ (27438) Mus. Wlsm.

HAB. HAWAII: Kona, 5000 to above 6000 ft., (4) 30. VI.—30. VIII. 1892; Hualalai (Kona), 5000 ft., (1) 5. VIII. 1892; Mt. Kilauea, (1) VII. 1895. Six specimens.

A bright, metallic, and distinct species.

186. (50) *Hyposmocoma continuella*, sp. nov. (Pl. XX. fig. 2).

Antennae fuscous. Palpi whitish, the terminal joint shaded with fuscous. Head whitish, with a slight ochreous tinge. Thorax tawny fuscous, the tegulae tipped with whitish. Forewings tawny fuscous, with a broad whitish streak along the fold, from the middle of the base to the tornus, and thence continued along the base of the terminal cilia, where it assumes a yellowish tint, to the apex; along the middle the costa is very narrowly whitish; cilia brownish cinereous. Exp. al. 12 mm. Hindwings and cilia brownish cinereous. Abdomen fuscous. Legs pale cinereous.

Type ♀ (26623) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., IV. 1894. Unique.

This species may be distinguished from *indicella* by its paler head and general colouration, and by the median line not being interrupted above the tornus.

187. (51) *Hyposmocoma indicella*, sp. nov. (Pl. XX. fig. 3).

Antennae fuscous. Palpi whitish, with a dark line along their under side, terminal joint fuscous. Head greyish fuscous, an ochreous lateral line above each eye. Thorax greyish fuscous, with some whitish lines on the tegulae. Forewings dark tawny, with a strong yellowish white streak from the middle of the base along the fold, abruptly terminated above the tornus; this is followed by a short yellowish white streak along the middle of the termen at the base of the greyish fuscous cilia. Exp. al. 10—11 mm. Hindwings fuscous; cilia dark greyish fuscous; ♂ without subcostal hair-pencil. Abdomen dark fuscous. Legs pale cinereous, the tarsi shaded above with greyish fuscous.

Type ♂ (26639); ♀ (28300) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft. and above, (3) III. 1894, (1) V. 1896. Four specimens.

The dark head, with distinct lateral lines on the head and tegulae, and the abrupt termination of the median line on the forewings distinguish this species from *continuella*.

188. (52) *Hyposmocoma patriciella*, sp. nov. (Pl. XX. fig. 4).

Antennae smoky black. Palpi whitish cinereous, sprinkled with smoky black, especially on their outer sides. Head brassy grey. Thorax blackish, tegulae touched with white scales. Forewings dark tawny fuscous (almost blackish), a diffused line of white scaling along the fold, somewhat dilated before the tornus, with a few scattered scales beneath the costa and a small group of the same at the costal cilia; cilia dark tawny fuscous; under side purple. Exp. al. 12 mm. Hindwings very dark purple; cilia tawny fuscous; under side purplish fuscous; ♂ without subcostal hair-pencil. Abdomen blackish. Legs dark tawny fuscous, tarsi with two or three whitish spots.

Type ♂ (28306) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., V. 1896. Unique.

The dark purple hindwings and the absence of the subcostal hair-pencil on the hindwings, as well as of the mealy patch on the under side of the forewings, separate this species from *butalidella* Wlsm., which it otherwise resembles. It is larger than *indicella* Wlsm., from which it differs also in its purple hindwings and in the absence of whitish ochreous scales at the base of the terminal cilia.

189. (53) *Hyposmocoma butalidella*, sp. nov. (Pl. XX. fig. 5).

Antennae fuscous. Palpi, terminal joint as long as median; fuscous externally, whitish on their inner sides. Head and Thorax brownish fuscous. Forewings brownish fuscous, almost black, with a slightly diffused white streak along the fold from the middle of the base; a white anteapical transverse fascia is diffused outward at its middle, and is sometimes preceded by some white subcostal scales; cilia greyish fuscous; on the under side, from near the base to the end of the cell, is a pale, almost whitish, mealy-looking patch, not reaching the costa but diffused downward toward the dorsum in the ♂. Exp. al. 12—14 mm. Hindwings pale greyish fuscous; cilia greyish fuscous; ♂ with an expansible blackish subcostal hair-pencil. Abdomen and Legs dark fuscous, the anal tuft and under side of the tarsi cinereous.

Type ♂ (26530); ♀ (28290) Mus. Wlsm.

HAB. MAUI: Haleakala, 7000 ft., IV. 1894, about 6000 ft., V. 1896. Two specimens.

The single ♀ loses the white markings, exhibiting only a few scales about the position of the costal spot.

190. (54) *Hyposmocoma unistriata*, sp. nov. (Pl. XX. fig. 6).

Antennae cinereous, basal joint brownish. Palpi dirty whitish on their inner sides, shaded with brownish fuscous externally, except at the apex of the median joint. Head white. Thorax tawny fuscous, with white lateral streaks. Forewings tawny fuscous, with a broad white streak commencing at the base of the costa and following the fold nearly to its outer extremity, where there is a small round white dorsal spot, a larger white costal spot lying above and a little beyond it, with a narrow elongate white spot preceding it on the middle of the costa; cilia tawny fuscous, with a slight greyish tinge; under side brownish grey, with a faint indication of the two costal spots on the extreme margin. Exp. al. 13—14 mm. Hindwings dark brownish grey; cilia tawny grey; ♂ without subcostal hair-pencil. Abdomen and Legs brownish grey.

Type ♂ (26382); ♀ (26153) Mus. Wlsm.

HAB. MOLOKAI: 4000 ft. and upwards, (2) VI. 1893; forest above Pelekunu, (2) 29. VIII. 1893; 4500 ft., (1) 11. IX. 1893. Five specimens.

The white markings are sometimes tinged with ochreous. This species differs from *lineata* in its browner colour, in the greater breadth of the white markings, the spots touching the costa, in the longer plical streak and in the white head.

191. (55) *Hyposmocoma ludificata*, sp. nov. (Pl. XX. fig. 7).

Antennae dark fuscous. Palpi dark fuscous, paler on their inner side, with a minute white speck at the end of the median joint. Head dark bronzy fuscous. Thorax dark tawny fuscous, a whitish streak at the edge of the tegulae. Forewings dark tawny fuscous, almost black, with a clear, shining, white plical streak from the base to beyond the middle, a white costal spot above its outer extremity, and two marginal spots beyond it, the costal round, the tornal suberect and slightly oblique; an indication of whitish scales occurs at the apex in the dark tawny greyish cilia. Exp. al. 14—16 mm. Hindwings and cilia dark tawny grey; ♂ with an ochreous subcostal hair-pencil. Abdomen dark greyish fuscous. Legs dark tawny grey, spurs whitish beneath.

Type ♂ (28381); ♀ (28304) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., V. 1896; Olinda (Haleakala), 4000 ft., (1) V. 1896. Ten specimens.

Only distinguishable from *lineata* Wlsm., by the subcostal hair-pencil of the ♂, by its slightly larger size and rather broader white markings, and by the white cilia at the apex of the forewings.

192. (56) *Hyposmocoma lineata*, sp. nov. (Pl. XX. fig. 8).

Antennae fuscous. Palpi fuscous, the median joint whitish on the inner side and sprinkled with whitish externally at the base. Head brownish fuscous. Thorax dark tawny fuscous, with a slender whitish line along each side. Forewings and cilia dark tawny fuscous, a slender white line along the fold from the base to half the wing-length; above its outer extremity is a white subcostal spot, followed by a smaller one near the commencement of the costal cilia, with a similar one opposite to it, adjacent to the dorsum before the tornus; under side brownish fuscous, unspotted. Exp. al. 13 mm. Hindwings brownish fuscous; cilia dark tawny fuscous; ♂ without subcostal hair-pencil. Abdomen dark fuscous. Legs brownish fuscous.

Type ♀ (26568); ♂ (28266) Mus. Wlsm.

Hab. Maui : Haleakala, 5000 ft., iii.—iv. 1894, v. 1896. Six specimens.

Extremely similar to *ludificata* Wlsm., the markings are, however, more slender. The absence of the subcostal hair-pencil and of the white spot in the cilia at the apex of the forewings enables this species to be distinguished.

193. (57) *Hyposmocoma propinqua*, sp. nov. (Pl. XX. fig. 9).

Antennae fuscous. Palpi, terminal joint shorter than the median ; median joint whitish on the inner side, smeared with fuscous externally. Head and Thorax fuscous. Forewings fuscous, with a slight tawny tinge, a white basal streak runs from the middle along the upper edge of the fold to half its length, a conspicuous white spot lying on the fold above the tornus, preceded by a dark fuscous spot in the fold touching its inner edge ; beyond and above this is a small white costal spot a little before the apex ; cilia fuscous, tipped with white at the extreme apex. Exp. al. 10 mm. Hindwings brownish fuscous ; cilia fuscous ; ♂ with an expansible fuscous subcostal hair-pencil. Abdomen dark fuscous ; anal claspers of the ♂ very strongly developed, each with three long curved points projecting inward. Legs fuscous, with two white tarsal dots.

Type ♂ (26152) Mus. Wlsm.

Hab. Molokai : 4000 ft., vi. 1893. Unique.

This species appears to be closely allied to *admirationis*, differing in the absence of the transverse fascia and in the dark head.

194. (58) *Hyposmocoma admirationis*, sp. nov. (Pl. XX. fig. 10).

Antennae cinereous. Palpi, terminal joint shorter than the median ; median joint purplish grey, terminal joint whitish. Head white ; face grey. Thorax brownish fuscous, with a white line along the middle of the tegulae. Forewings brownish fuscous, with a strong snow-white streak from the middle of the base above the fold, abruptly terminated before the middle of the wing and followed by a large snow-white spot, narrowly separated from the dorsum before the tornus ; on the costa between these is a minute white streaklet ; a white fascia crosses the wing before the apex, attenuated and outwardly angulated at its middle ; the tips of the apical cilia are white, shaded along their base and about the tornus with brownish fuscous. Exp. al. 9—10 mm. Hindwings and cilia brownish fuscous ; ♂ with an expansible greyish subcostal hair-pencil. Legs brownish fuscous, with a white spot at each extremity of the tibiae and two white dots on the tarsi.

Type ♂ (26331) Mus. Wlsm.

Hab. Molokai : above 3000—4000 ft., 24. vi.—12. vii. 1893, (1) 16. ix. 1893. Four specimens.

195. (59) *Hyposmocoma quadristriata*, sp. nov. (Pl. XX. fig. 11).

Antennae dark fuscous. Palpi, terminal joint shorter than the median; dark fuscous, paler on their inner sides. Head and face cinereous, blending to brownish fuscous posteriorly. Thorax bronzy fuscous, the tegulae streaked with ochreous. Forewings bronzy fuscous, with four distinct pale ochreous streaks, or elongate patches, the longest commencing at the middle of the base extends to the middle of the fold, a shorter patch of the same colour lying on the cell above its outer extremity; the plical streak is followed by a second, shorter plical streak, not reaching the dorsum, and the discal patch is also followed by a second, rather longer discal patch, extending to the end of the cell, beyond which is a small lunate spot of the same colour; a line of pale ochreous scales runs along the base of the tawny fuscous terminal cilia. Exp. al. 11 mm. Hindwings and cilia tawny fuscous; ♂ without subcostal hair-pencil. Abdomen fuscous. Legs tawny fuscous.

Type ♂ (26355) Mus. Wlsm.

Hab. Molokai: about 4500 ft., 23. IX. 1893. Unique.

196. (60) *Hyposmocoma numida*, sp. nov. (Pl. XX. fig. 12).

Antennae black, the basal joint with a white spot at its apex. Palpi black, a white spot at the apex of the median joint and two small white spots on the terminal joint. Head black; face yellowish white. Thorax glossy, shining, black. Forewings glossy, shining, black, with snow-white specks; three on the costa, the first, very small near the base, the second in the middle, and the third at the commencement of the costal cilia; on the tornus opposite the last costal is a similar spot, and a few minute scale-specks are scattered about the disc and fold, but these are by no means so conspicuous as those on the margins; cilia smoky brown. Exp. al. 11 mm. Hindwings and cilia dark smoky brown; ♂ without subcostal hair-pencil. Abdomen black. Legs smoky brown, with whitish tarsal spots.

Type ♂ (28477) Mus. Wlsm.

Hab. Maui: Haleakala, 4000 ft., v. 1896. Unique.

A very distinct species.

197. (61) *Hyposmocoma nigrescens*, sp. nov. (Pl. XX. fig. 13).

Antennae smoky black. Palpi cinereous, externally blackish. Head cinereous, blackish at the sides. Thorax tawny black. Forewings tawny black, with a few scattered pale ochreous scales, scarcely visible except in a few irregularly scattered spots around the termen and apex, the first of this broken series being in the costal cilia; cilia smoky blackish. Exp. al. 10—11 mm. Hindwings dark tawny fuscous; cilia blackish, with a slight purplish tinge; ♂ without subcostal hair-pencil. Abdomen black. Legs smoky fuscous.

Type ♂ (27395) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VII. 1895, VIII. 1896. Three specimens.

In another specimen, ♂ (27505), which I take to belong to the same species, the pale scales are rather white than ochreous, and some of these are grouped near the base, especially on the fold.

198. (62) *Hyposmocoma fuscopurpurea*, sp. nov. (Pl. XX. fig. 14).

Antennae and Palpi purplish fuscous. Head bronzy. Thorax, Forewings and cilia unicolorous dark purplish fuscous. Exp. al. 10—12 mm. Hindwings tawny purplish; cilia dark purplish grey; ♂ without subcostal hair-pencil. Abdomen dark purple. Legs purplish grey.

Type ♂ (26592); ♀ (26594) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., (4) III.—IV. 1894, (3) V. 1896; Olinda (Haleakala), 4000 ft., (3) IV. 1894, (2) V. 1896. Twelve specimens.

199. (63) *Hyposmocoma niger*, sp. nov. (Pl. XX. fig. 15).

Antennae smoky black, the basal joint cinereous beneath. Palpi cinereous, blackish on their outer sides. Head shining, black; face brownish cinereous. Thorax bronzy black. Forewings unicolorous bronzy black; cilia with a slight brownish tinge. Exp. al. 10 mm. Hindwings and cilia tawny brownish black; ♂ without subcostal hair-pencil. Abdomen and Legs black.

Type ♂ (26099) Mus. Wlsm.

HAB. MOLOKAI: about 4000 ft., VI. 1893. Unique.

200. (64) *Hyposmocoma lacertella*, sp. nov. (Pl. XX. fig. 16).

Antennae tawny fuscous. Palpi tawny fuscous, whitish on the inner side of the median joint, and narrowly around the apex of the terminal joint. Head brownish fuscous. Thorax dark tawny fuscous. Forewings dark tawny greyish fuscous, with dirty white speckling beyond the middle; a small whitish smear, about the middle of the costa, is followed by a white spot at the commencement of the costal cilia, with another opposite to it at the tornus; a small spot in the fold at its outer third, a smaller one at the end of the cell, and several groups of whitish scales, before and about the apex, forming streaklets through the basal half of the costal and terminal cilia which are tipped with whitish immediately below the apex, but otherwise tawny fuscous. Exp. al. 14—16 mm. Hindwings bronzy brownish fuscous; cilia tawny fuscous; ♂ without subcostal hair-pencil. Abdomen dark fuscous. Legs tawny greyish fuscous.

Type ♀ (28526); ♂ (28307) Mus. Wlsm.

HAB. MAUI: Olinda (Haleakala), 4000 ft.; Haleakala, 5000 ft., v. 1896. Seventeen specimens.

201. (65) *Hyposmocoma trilunella*, sp. nov. (Pl. XX. fig. 17).

Antennae fuscous, the basal joint streaked with white above. Palpi greyish fuscous, a white spot at the end of the median joint. Head white; face grey. Thorax brownish fuscous. Forewings brownish fuscous, with a slight tawny gloss, cilia the same; with three rounded yellowish white spots, one on the middle of the fold, one, larger, on the cell above and beyond it, a third, still larger, at the end of the cell. Exp. al. 16 mm. Hindwings rather shining, steel-grey; cilia tawny grey. Abdomen greyish fuscous. Legs pale greyish fuscous, the tarsal joints marked with whitish.

Type ♀ (28247) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., v. 1896. Seven specimens.

202. (66) *Hyposmocoma niveiceps*, sp. nov. (Pl. XX. fig. 18).

Antennae bronzy brownish above, paler beneath; basal joint snow-white. Palpi brownish fuscous, with a white band around the junction of the joints. Head white; face bronzy grey. Thorax dark bronzy brown. Forewings bronzy brown, with a conspicuous round snow-white spot at the end of the cell; a white spot crossing the fold beyond its middle and nearly confluent with a biocellate white spot on the disc, above and a little before it, having the form of an oblique figure **8**, the upper dark dot preceding the lower; cilia bronzy brownish. Exp. al. 11—12 mm. Hindwings and cilia pale brownish grey; ♂ without subcostal hair-pencil. Abdomen brownish grey, anal tuft whitish. Legs cinereous; tarsi fuscous, obscurely banded with whitish.

Type ♂ (26470) *Lanai*, Mus. Wlsm.

HAB. LANAI: 2000—3000 ft., (5) I.—II. 1894; 2000 ft., (1) VII. 1894.—MOLOKAI: above 3000—4500 ft., (3) 13. VI.—VII. 1893. Nine specimens.

Variation: the white spot at the end of the cell is sometimes ocellate (26134 *Molokai*; 26471 *Lanai*); the two inner spots are sometimes confluent, no spot being ocellate (26403 *Molokai*); the three white spots become obsolete, their position indicated only by three or four white scales in each place (26450 *Molokai*); an intermediate form occurs with enlarged inner spots obscurely surrounded with whitish (26471 *Lanai*).

203. (67) *Hyposmocoma punctifumella*, sp. nov. (Pl. XX. fig. 19).

Antennae sooty black above, paler beneath; the basal joint yellowish white. Palpi fuscous, with a yellowish white ring around the junction of the joints. Head yellowish white, with a slightly raised blackish collar behind. Thorax dark sooty brown. Forewings dark sooty brown, with two yellowish white spots; the first pear-shaped, oblique, its base below the costa at two-fifths, its apex crossing the fold but not reaching the dorsum; the second roundish, at the end of the cell,—both conspicuous and clearly defined; cilia sooty brown. Exp. al. 12 mm. Hindwings and cilia brown-grey; ♂ without subcostal hair-pencil. Abdomen brownish grey. Legs brownish grey.

Type ♂ (28577) Mus. Wlsm.

HAB. MAUI: Olinda (Haleakala), 4000 ft., v. 1896. Unique.

204. (68) *Hyposmocoma lunifer*, sp. nov. (Pl. XX. fig. 20).

Antennae blackish. Palpi blackish, but with a whitish suffusion on the median joint. Head brown. Thorax tawny black. Forewings tawny black, with a conspicuous round white spot at the end of the cell; a black discal spot before the middle, narrowly encircled, except on its lower edge, by white; a black plical spot before it, also partially encircled by white, and preceded by some white scales in the fold; a few whitish scales along the termen at the base of the tawny blackish cilia. Exp. al. 14—15 mm. Hindwings brown-black; cilia tawny blackish. Abdomen black. Legs tawny brownish, with faint paler tarsal spots.

Type ♀ (28393) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., v. 1896. Two specimens.

205. (69) *Hyposmocoma punctiplicata*, sp. nov. (Pl. XX. fig. 21).

Antennae brownish fuscous. Palpi brownish fuscous, with a pale spot at the end of each joint. Head brownish grey. Thorax dark bronzy brown. Forewings bronzy brown, with whitish ochreous spots, and some scattered scales; an obliquely transverse spot rests on the fold at one-fourth from the base, another on the dorsum below the outer end of the fold, a third, narrow and outwardly oblique, arises beyond the tornus, a rounder costal spot standing opposite to it; cilia tawny greyish fuscous. Exp. al. 15 mm. Hindwings and cilia brownish grey. Abdomen (missing). Legs brownish grey, with paler spots on the tarsal joints.

Type ♀ (26303) Mus. Wlsm.

HAB. MOLOKAI: above 4500 ft., 11. IX. 1893. Unique.

Allied to *lacertella*, but the ♂ is at present unknown.

206. (70) *Hyposmocoma marginenotata*, sp. nov. (Pl. XX. fig. 22).

Antennae dark brown. Palpi dark brown, with a pale ochreous patch at the end of the median joint. Head and Thorax dark brown. Forewings, ♂ with a slight costal fold and a strong fringe of scales extending beyond the middle on the under side; dark tawny brown, with a slender line of pale ochreous scales, commencing near the middle of the base, depressed obliquely to the dorsum where it is bestrewed with brown scales, and extending around the tornus, termen and apex to a small anteapical costal spot in a line of scarcely confluent small, pale ochreous, marginal spots along the base of the dark tawny brown cilia. Exp. al. 14—16 mm. Hindwings grey; cilia grey, with a brownish tinge; ♂ with a greyish subcostal hair-pencil. Abdomen and Legs brownish grey; the tarsi shaded.

Type ♂ (26768); ♀ (27332) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895; Mts., 3000—4000 ft., V.—VI. 1894. Thirty-five specimens.

In some specimens the ground-colour of the forewings is sooty brown and the ochreous markings are only represented by two faintly indicated opposite spots before the apex, and a series of indistinct terminal spots. The usual discal and plical spots are visible in specimens in which more or less admixture of ochreous scaling occurs among the dark ground-colour, but they are not traceable when this is absent.

207. (71) *Hyposmocoma vermiculata*, sp. nov. (Pl. XX. fig. 23).

Antennae and Palpi bronzy brown, the latter with a pale ochreous ring at the apex of the median joint and another at the tip of the terminal joint. Head and Thorax dark bronzy brown. Forewings dark bronzy brown, with a few pale ochreous scales, these form a small vermicular streak, in the basal half of the fold, which is preceded and followed by dark fuscous spots—these also occur at the end of the fold and on the outer half of the cell; a small pale ochreous spot lies at the commencement of the costal cilia and another on the termen opposite, but a little beyond it; cilia dark fuscous brown, with some ochreous scales along their base divided into minute spots. Exp. al. 14—15 mm. Hindwings and cilia pale tawny grey; ♂ without subcostal hair-pencil. Abdomen greyish fuscous. Legs pale tawny grey.

Type ♂ (28117) *Hawaii*, Mus. Wlsm.

HAB. MOLOKAI: about 4000 ft., (2) 9. VI. 1893.—HAWAII: Mt. Kilauea, (1) VII. 1895, (1) VIII. 1896; Kaawaloa (Kona), above 2000 ft., (1) IX. 1892. Five specimens.

This species differs from *marginenotata* in the absence of the subcostal hair-pencil, in the presence of a minute pale streak in the basal half of the fold, in the less distinct spotting of the termen and in the position of the tornal spot which is a little beyond the opposite costal.

208. (72) *Hyposmocoma enixa*, sp. nov. (Pl. XX. fig. 24).

Antennae bronzy fuscous, the under side of the basal joint pale ochreous. Palpi bronzy fuscous, with a pale ochreous ring at the apex of the median joint. Head bronzy fuscous; face pale ochreous. Thorax dull bronzy fuscous. Forewings bronzy fuscous, with three dark fuscous spots, two discal, one plical, the latter preceding the first discal; cilia dull greyish fuscous. Exp. al. 14 mm. Hindwings pale grey; cilia pale brownish grey; ♂ without subcostal hair-pencil. Abdomen whitish cinereous. Legs pale brownish grey, the hind tarsi scarcely shaded.

Type ♂ (27932) Mus. Wlsm.

Hab. Kauai: Kaholuamano, 4000 ft., iv. 1895. Three specimens.

Very similar to *fulvida*, but separable by the pale basal joint of the antennae, by the more bronzy tint, the somewhat more abrupt apex of the forewings, and the distinctly paler face. The spots are not ocellated as in *ocellata*. It is very close to *adolescens*, but the more yellowish bronzy fuscous of the forewings distinguishes it from the browner species which also possesses more strongly developed ♂ genital appendages and appears to be without doubt distinct.

209. (73) *Hyposmocoma lugens*, sp. nov. (Pl. XX. fig. 25).

Antennae rather stout, brownish fuscous. Palpi rust-brownish, the terminal joint fuscous externally. Head rust-brownish. Thorax brownish fuscous. Forewings brownish fuscous, with the usual three spots, very difficult to distinguish on the dark wing-surface; cilia smoky brownish fuscous. Exp. al. 13 mm. Hindwings brownish grey; cilia smoky brownish fuscous; ♂ without subcostal hair-pencil. Abdomen brownish fuscous. Legs greyish fuscous.

Type ♂ (26583); ♀ (28364) Mus. Wlsm.

Hab. Maui: Haleakala, 5000 ft., iii. 1894, v. 1896. Two specimens.

I have found no species which at all agrees with this. The wings are narrow, with very straight costa; the head, distinct in colour from the unicolorous forewings, leading one at first to suppose that it might be a suffused variety of some more clearly marked species, but I am quite unable to make it fall into any of the series.

210. (74) *Hyposmocoma ocellata*, sp. nov. (Pl. XX. fig. 26).

Antennae dark bronzy brown; basal joint streaked beneath with pale ochreous, and with a spot of the same colour at its outer end. Palpi shining, very pale ochreous, terminal joint completely shaded with bronzy brown, a slender pale ochreous line along the upper edge, not clearly defined. Head bronzy brown. Thorax bronzy brown, the centre rather darker than the tegulae. Forewings shining, bronzy brown, with a purplish fuscous spot on the middle of the disc, another before it on the fold, and a smaller one at the end of the cell (this and the preceding discal spot are nearly connected by a streak of the same colour) each spot more or less distinctly outlined with very pale ochreous, of which a slender line runs to the lower edge of the streak on the outer half of the cell; cilia brownish grey. Exp. al. 15—18 mm. Hindwings very pale grey; cilia pale brownish grey; ♂ without subcostal hair-pencil. Abdomen shining, brownish grey. Legs brownish grey.

Type ♀ (27960); ♂ (27668) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895. Four specimens.

In some specimens a certain admixture of pale ochreous occurs above and below the outer end of the cell, giving the wing a somewhat streaky appearance.

This species is nearly allied to *fulvida*, but the hindwings are paler, the forewings more shining and the spots are pale-margined, whereas in the other species they show no ocellation.

211. (75) *Hyposmocoma adolescens*, sp. nov. (Pl. XX. fig. 27).

Antennae bronzy brown above; pale cinereous, barred with brown beneath. Palpi dark brown, blending to pale brassy ochreous on their inner sides and around the apex of the median joint. Head and Thorax bronzy brown above; the upper part of the face pale brassy ochreous. Forewings and cilia bronzy brown, the latter becoming brownish grey towards the tornus; with three dark fuscous spots, one on the middle of the fold, one beyond it on the cell, another at the end of the cell. Exp. al. 15 mm. Hindwings pale grey; cilia pale brownish grey; ♂ without subcostal hair-pencil. Abdomen whitish grey. Legs whitish grey, with brownish shading around the tarsi.

Type ♂ (27474) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VIII. 1895. Unique.

Closely allied to *ensifer*, but distinguished by its dark palpi and the darker ground-colour of the forewings which lacks the ochreous suffusion of that species.

212. (76) *Hyposmocoma emendata*, sp. nov. (Pl. XX. fig. 28).

Antennae tawny fuscous. Palpi brassy ochreous, the terminal joint shaded beneath with fuscous. Head and Thorax bronzy fuscous, the face paler. Forewings dark bronzy fuscous, mixed with more or less ochreous along the fold, and sometimes on the discal area and at the tornus; the dark discal and plical spots are not ocellate; cilia smoky fuscous. Exp. al. 17—18 mm. Hindwings and cilia dark brownish fuscous; ♂ without subcostal hair-pencil. Abdomen brownish fuscous. Legs brownish fuscous, with a few indistinct paler spots at the joints; hind tibiae hairy.

Type ♂ (28289); ♀ (28284) Mus. Wlsm.

HAB. MAUI: Haleakala, above 5000 ft., (1) IV. 1894, 5000 ft., (4) V. 1896. Five specimens.

Hyposmocoma spp.?

Two specimens in poor condition may represent distinct species.

HAB. OAHU: Waianae Mts., 3000 ft., IV. 1892 (25127, Mus. Wlsm).—MOLOKAI: above 3000 ft., 30. V. 1893 (26071, Mus. Wlsm).

213. (77) *Hyposmocoma ensifer*, sp. nov. (Pl. XXI. fig. 1).

Antennae cinereous, the basal joint pale ochreous. Palpi very long, slender, terminal joint as long as median; whitish ochreous. Head and Thorax bronzy; face shining whitish; tegulae bronzy. Forewings ochreous, smeared with bronzy brownish along the margins and towards the apex, sometimes more generally suffused with the same; with four dark fuscous spots, one on the cell and one at the end of the cell, each slightly preceded by a more elongate spot on the fold, the outer plical spot sometimes obliterated; cilia brownish grey. Exp. al. 15 mm. Hindwings and cilia pale brownish grey; ♂ without subcostal hair-pencil. Abdomen greyish fuscous, anal tuft pale ochreous. Legs pale ochreous, more or less shaded transversely with fuscous.

Type ♂ (27472) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VII.—VIII. 1895. Five specimens.

This species separates itself, from *emendata* and *adolescens*, by its white face and uniformly pale palpi, and although variable in the extent of the dark suffusion I cannot venture to describe the darker and lighter forms as distinct.

Hyposmocoma spp.?

Three specimens in poor condition may represent distinct species.

HAB. MAUI: Haleakala, 3000 ft., III. 1894 (26558, Mus. Wlsm).—MOLOKAI: above 3000 ft., 13. VI. 1893 (26293, 26249, Mus. Wlsm.).

214. (78) *Hyposmocoma tricincta*, sp. nov. (Pl. XXI. fig. 2).

Antennae brownish fuscous. Palpi, median joint white, brownish at the base; terminal joint as long as median, brownish fuscous, except at its base which is white. Head and face shining, cream-white. Thorax brownish fuscous. Forewings brownish fuscous, with three blackish spots; one in the form of an elongate streak lying in the fold scarcely beyond its middle, with a small one above it on the cell, the third larger, obliquely ovoid, at the end of the cell; these spots are all placed in a connected irregular white patch which is somewhat diffused toward the costa beyond the middle, but forms a clear margin around the spots themselves (the lower edge of the plical spot sometimes excepted); cilia brownish cinereous. Exp. al. 14—15 mm. Hindwings shining, pale grey; cilia pale brownish cinereous; ♂ without subcostal hair-pencil. Abdomen pale brownish cinereous. Legs pale brownish cinereous, the tarsi with faint paler bands.

Type ♀ (25435); ♂ (25434) Mus. Wlsm.

HAB. HAWAII: Kona, above 2000—4000 ft., 4. VIII.—IX. 1892; Mt. Kilauea, (1) VII. 1895. Six specimens.

215. (79) *Hyposmocoma semifuscata*, sp. nov. (Pl. XXI. fig. 3).

Antennae smoky fuscous, basal joint white beneath. Palpi white, shaded with smoky fuscous externally nearly to the end of the median joint and nearly to the base of the terminal. Head white, sometimes slightly smoky above; face white. Thorax smoky fuscous. Forewings white, sprinkled with smoky fuscous, with a smoky fuscous shade from the base extending along the costa and dorsum and sometimes almost obliterating the elongate black plical spot which is situated before the first discal; this and the outer discal spot are also black and clearly defined; the apex is slightly smoky in some specimens; cilia whitish, varying to smoky, especially along the dorsum. Exp. al. 12—15 mm. Hindwings shining, pale grey; cilia pale brownish cinereous; ♂ without subcostal hair-pencil. Abdomen smoky whitish. Legs dirty whitish, with some smoky tarsal bands; these are scarcely traceable in the paler varieties.

Type ♂ (25395); ♀ (25270) Mus. Wlsm.

HAB. HAWAII: Kona, above 2000—4000 ft., (2) VI. 1892, (9) IX. 1892. Eleven specimens.

Separated from *tricincta* by the limited extent of the darker shading, by the position of the plical spot, which in that species is produced outward, often beyond the first discal, and by the colour of the palpi.

216. (80) *Hyposmocoma pucciniella*, sp. nov. (Pl. XXI. fig. 4).

Antennae dark brown, faintly annulate with pale straw-ochreous. Palpi pale straw-ochreous, shaded with fuscous along the outer side. Head and Thorax pale straw-ochreous, tegulae dark brown at the base. Forewings pale straw-ochreous, rather distinctly marked with dark brown; a dark brown streak from the base follows the fold along two-thirds of its length; a small patch at the base, below the fold, and a few scales scattered along the costa—these three markings sometimes coalesce towards the base; an elongate dark brown median spot on the discal cell and a second, rounder one, at its outer end, the latter almost concealed by a dark bronzy brown shade overspreading the apical area beyond the cell—this shade is slightly diffused inward below the lower angle; costal cilia brown, terminal cilia pale straw-ochreous. Exp. al. 13—15 mm. Hindwings and cilia pale brownish grey; ♂ without subcostal hair-pencil. Abdomen greyish brown. Legs pale brownish grey.

Type ♀ (27381); ♂ (27408) Mus. Wlsm.

Hab. Hawaii: Kona, 3500—5000 ft., 29. vi.—10. viii. 1892; Mt. Kilauea, vi.—vii. 1895. Thirteen specimens.

Veins 7 and 8 of the forewings are exceptionally connate.

217. (81) *Hyposmocoma scepticella*, sp. nov.

217ª. (81ª) *scepticella*, sp. nov. + *scepticella*, var. nov. (Pl. XXI. fig. 6).

Antennae, ♂ dark fuscous: paler in ♀. Palpi whitish ochreous. Head and Thorax ochreous; face whitish ochreous; tegulae pale ochreous, touched with fuscous at the base. Forewings bright ochreous, with a fuscous spot at the base of the costa, a few fuscous limbal scales, a discal spot about the middle, another at the end of the cell and one at the end of the fold, before the tornus, touching the dorsum; the outer discal spot sends forward a diffused and somewhat dilated fuscous shade to the costal cilia a little before the apex, the tornal spot is also sometimes diffused outwards; terminal cilia ochreous, dorsal cilia smoky fuscous; under side uniformly dark smoky grey, except a small ochreous spot on the termen below the apex, the terminal cilia are also ochreous. Exp. al. 14—16 mm. Hindwings, ♂ without subcostal hair-pencil; dark smoky fuscous, cilia slightly browner than the wing: ♀ paler than in the ♂. Abdomen dark smoky fuscous. Legs smoky grey, with faint paler spots.

Type ♂ (26650); ♀ (26675) Mus. Wlsm.

Hab. Maui: Olinda (Haleakala), 4000 ft., iv. 1894. Three specimens.

This species differs from *stigmatella* notably in the pale ochreous tegulae, those of *stigmatella* being always brownish fuscous.

217ᵇ. (81ᵇ) *scepticella*, Wlsm. + *dubia*, var. nov. (Pl. XXI. fig. 5).

In three specimens the basal joint of the antennae is ochreous, the general colour of the wing being slightly paler, and in two of these the dark shading towards the apex is omitted the spots also being less distinct.

Type ♂ (28496); ♀ (28534) Mus. Wlsm.

Hab. Maui: Haleakala, below 4000—5000 ft., v. 1896; Olinda (Haleakala), 4000 ft., v. 1896. Three specimens.

218. (82) *Hyposmocoma stigmatella*, sp. nov. (Pl. XXI. fig. 7).

Antennae brownish fuscous, barred with ochreous beneath. Palpi, ♀ whitish, with a slight brownish fuscous shade along the outer side of the median joint and beneath the terminal joint: ♂ without dark shading. Head and Thorax whitish ochreous, tegulae brownish fuscous. Forewings, ♀ rich ochreous, with a brownish fuscous spot at the base, throwing a short projection along the costa, and another, parallel with the dorsum and almost touching it; a brownish fuscous spot on the middle of the fold is followed by another on the disc obliquely above and beyond it, and there is an indication of a dark fuscous spot at the end of the cell, connected with a triangular dorsal shade beneath it, as well as with a similar brownish fuscous shade extending to the apex and embracing the costal cilia beyond and above it; cilia brownish grey: ♂ paler than the ♀, with the markings obsolete, except the spot at the base with costal and subdorsal projections, an obscure dark spot at the end of the cell, a few dark scales at the tornus and on the costa before the apex; terminal cilia pale ochreous, tornal cilia brownish grey; under side leaden grey, cilia as on the upper side in both sexes, but the pale ochreous extends narrowly along the costa for about half its length in the ♂, and the termen is obscurely spotted with ochreous in the ♀. Exp. al. 12—14 mm. Hindwings leaden grey; cilia brownish grey; ♂ without subcostal hair-pencil. Abdomen dark brownish grey; anal tuft of ♂ subochreous. Hind Legs whitish cinereous beneath, much shaded with dark brownish grey above.

Type ♀ (26353); ♂ (26354) Mus. Wlsm.

HAB. MOLOKAI: about 4000 ft., (1) 9. VI. 1893, about 4500 ft., (3) 23. IX. 1893. Four specimens.

This species may be distinguished from *scepticella* by its brownish fuscous tegulae.

219. (83) *Hyposmocoma pallidipalpis*, sp. nov. (Pl. XXI. fig. 8).

Antennae serrate; dull brownish cinereous, the basal joint pale ochreous. Palpi pale ochreous. Head and face grey. Thorax brownish grey, the tegulae yellowish brown. Forewings yellowish brown, with a small darker spot about the middle of the fold and another more distinct at the end of the cell; cilia greyish brown. Exp. al. 12 mm. Hindwings pale leaden grey; cilia brownish grey; ♂ without subcostal hair-pencil. Abdomen (missing). Legs pale cinereous.

Type ♂ (26106) Mus. Wlsm.

HAB. MOLOKAI: about 4000 ft., 9. VI. 1893. Unique.

220. (84) *Hyposmocoma genitalis*, sp. nov. (Pl. XXI. fig. 9).

Antennae pale fawn-ochreous, basal joint with a slightly darker shade above. Palpi pale fawn-ochreous, with a shade-ring near the apex of the median joint and another at the base of the terminal. Head and Thorax fawn-ochreous; face very pale fawn-ochreous. Forewings pale fawn-ochreous, smeared with fawn-brownish, especially along the dorsum and beyond the end of the cell; some scattered fawn-brownish spots are somewhat ill-defined—one at the extreme base of the costa is almost fuscous; one at the commencement of the outer third of the fold, rather paler, followed by a patch at the tornus; a spot at the end of the cell, preceded by a smaller one, and a shade on the costa above it; another spot is indicated near the base of the fold, and a small subcostal spot a little before the middle; the margins above and below the apex have a slightly dentate appearance owing to a thin broken line of fawn-brownish scales at the base of the pale fawn-ochreous cilia. Exp. al. 18—20 mm. Hindwings shining, pale brownish grey; cilia brownish grey; ♂ with a pale yellowish ochreous subcostal hair-pencil. Abdomen grey; genital appendages upturned, very largely developed, appearing to terminate above in two rounded knobs. Legs very pale fawn-ochreous.

Type ♂ (28560); ♀ (28572) Mus. Wlsm.

HAB. MAUI: Olinda (Haleakala), 4000 ft., v. 1896. Two specimens.

221. (85) *Hyposmocoma fractinubella*, sp. nov. (Pl. XXI. fig. 10).

Antennae pale brownish, faintly annulate. Palpi whitish ochreous, the median joint shaded at its base and spotted near its apex with fuscous. Head and Thorax whitish ochreous. Forewings whitish ochreous, with broken bronzy brown shades and spots; a fuscous shade at the base of the costa is diluted into bronzy brown, following the upper edge of the cell to half its length, a diffused spot of the same colour on the outer end of the cell, an oblique darker spot preceding it on the fold below; the dorsum is clouded with a bronzy brown diffused shade, obliquely upturned and darkened about the tornus, with some similar diffused scales between its apex and the commencement of the costal cilia; a triangular dark spot at the extreme apex is narrowly diffused inward along the costa and termen before the base of the whitish ochreous cilia, through the middle of which runs a bronzy brown shade-line passing around the apex. Exp. al. 14—15 mm. Hindwings and cilia brownish grey; ♂ with an ochreous subcostal hair-pencil. Abdomen dark grey, anal tuft shining whitish. Legs whitish ochreous, the tarsi with faint shade-bands.

Type ♂ (28559); ♀ (28573) Mus. Wlsm.

HAB. MAUI: Olinda (Haleakala), 4000 ft., v. 1896. Seven specimens.

222. (86) *Hyposmocoma* (?) *fractivittella*, sp. nov. (Pl. XXI. fig. 11).

Antennae whitish ochreous, spotted above with brownish fuscous; a brownish fuscous streak along the basal joint above. Palpi whitish ochreous, shaded with brownish fuscous externally throughout. Head and face whitish ochreous. Thorax whitish ochreous, shaded along the middle and on the base of the tegulae with brownish fuscous. Forewings whitish ochreous, a long brownish fuscous streak extends from the base of the costa along the upper edge of the cell, terminating in a spot at its outer end; a narrow costal shade, commencing at three-fifths from the base, reaches nearly to the apex, a dorsal shade of the same colour from base to tornus; above the latter a small spot in the middle of the base and another in the middle of the fold; cilia pale brownish ochreous. Exp. al. 13 mm. Hindwings and cilia pale brownish grey. Abdomen pale brownish fuscous above, whitish ochreous at the sides and beneath. Legs whitish ochreous, the tarsi faintly shaded above.

Type ♀ (26743) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., VI. 1894. Unique.

This species probably belongs to a new genus differing from *Hyposmocoma* in having veins 4 and 5 of the forewings stalked, thus approaching *Dysphoria* from which, however, it differs in the remote origin of veins 4 and 5 of the hindwings. It would be unwise to found a new genus in this group on a single ♀ which may be merely of abnormal structure.

223. (87) *Hyposmocoma intermixta*, sp. nov. (Pl. XXI. fig. 12).

Antennae brownish grey, with faint paler annulations. Palpi very pale ochreous, suffused with greyish fuscous externally nearly to the apex of the median joint and around the base and apex of the terminal joint. Head and Thorax pale dingy ochreous, a grey shade on the middle of the latter. Forewings pale dingy ochreous, with a fuscous streak along the basal half of the costa, a broad fuscous shade along the outer third of the cell, scarcely separated from a narrower shade along the middle of the fold, below which the dorsum is slightly shaded with brownish fuscous, a narrow diffused band of the same running around the apex and termen and spreading over the base of the greyish ochreous cilia. Exp. al. 14 mm. Hindwings and cilia brownish grey. Abdomen dark brownish grey. Legs brownish grey.

Type ♀ (26104) Mus. Wlsm.

HAB. MOLOKAI: about 4000 ft., 9. VI. 1893. Unique.

224. (88) *Hyposmocoma geminella*, sp. nov. (Pl. XXI. fig. 13).

Antennae white, with faint brownish annulations. Palpi white, a brownish streak on the outer side of the basal half of the median joint and a faint ring near its apex; also a small dark spot at the base of the terminal joint. Head and Thorax white; tegulae blotched with pale brownish fuscous. Forewings shining, white, a slight brassy suffusion outwardly, especially near the costa above the end of the cell; two pale brownish fuscous streaks arising from the base, the first following the costa to two-fifths, but slightly separated from it in the ♂; the second following the lower edge of the cell as far as the middle of the wing where it terminates in a small plical spot; obliquely placed above and beyond it is a discal spot, followed by another at the end of the cell; a few brownish fuscous scales about the tornus are matched on the costa above it, and in some specimens a series of spots occurs in the terminal and costal cilia before the apex; cilia whitish, with an ochreous tinge. Exp. al. 13—17 mm. Hindwings grey; cilia brownish cinereous; ♂ with a pale ochreous subcostal hair-pencil. Abdomen brownish fuscous; anal appendages of the ♂ white. Legs dirty white.

Type ♂ (27212); ♀ (27545) Mus. Wlsm.

HAB. KAUAI: Halemanu, 4000 ft., (4) V. 1895; Mts., 3000—4000 ft., (1) VI. 1894. Five specimens.

The distinct subdorsal streak along the lower edge of the cell serves to separate this species from *picticornis*, which in other respects it greatly resembles, having very similar ornamentation on the palpi, but *picticornis* lacks the subcostal hair-pencil.

225. (89) *Hyposmocoma picticornis*, sp. nov. (Pl. XXI. fig. 14).

Antennae, ♂ pale brownish grey, the basal joint whitish, with an elongate dark brown spot above: ♀ pale bronzy, faintly annulate with whitish. Palpi white, the median joint with a dark brown annulus before the apex and a dark brown streak along the basal half externally, terminal joint with a dark brown spot above at its base and a slight ochreous tinge towards its apex; ♀ with the terminal joint longer than the median. Head and Thorax shining, white, a bronzy spot at the base of the tegulae. Forewings, ♂ silvery white, with a diffused pale greyish brown streak along the costa from the base to one-third, a small greyish brown spot on the fold beyond its middle, a similar spot obliquely above and beyond it on the cell, followed by a smaller spot at the end of the cell, from this last a few scattered brownish ochreous scales extend to the costa above and to the tornus beneath (in some specimens a dark costal and a tornal spot are also visible); some narrow confluent greyish brown spots occur round the apex at the base of the cilia which are light brownish ochreous: ♀ shining, silvery white, with a bronzy shade at the base of the costa, extending to one-third, leaving a whitish space on the costa about its middle; a bronzy dorsal streak extends from near the base, along the margin nearly to the tornus, almost touching a dark bronzy plical spot, beyond the middle of the fold, which is succeeded on the cell above by two dark bronzy discal spots, one before and one at the end of the cell; the costa above these and the apical region beyond them is bestrewed with bronzy scales, a dark broken line running around the apex at the base of the pale bronzy cilia. Exp. al. 14—18 mm. Hindwings shining, grey, cilia with a brownish tinge; ♂ without subcostal hair-pencil. Abdomen brownish grey, anal tuft inclining to ochreous. Legs whitish, with darker tarsal spots, hind tibiae with pale ochreous hairs.

Type ♂ (26177); ♀ (26283) *Molokai*, Mus. Wlsm.

HAB. MOLOKAI: above 3000 ft., (10) 30. V.—12. VI. 1893.—MAUI: Olinda (Haleakala), 4000 ft., (2) V. 1896. Twelve specimens.

226. (90) *Hyposmocoma phantasmatella*, sp. nov. (Pl. XXI. fig. 15).

Antennae bone-white, dotted above with fuscous, basal joint fuscous. Palpi bone-white, median joint fuscous externally; terminal joint longer than median, shaded with fuscous along the sides. Head and Thorax bone-white. Forewings, ♀ bone-whitish, with a minute fuscous dot in the middle of the fold, another scarcely beyond it on the disc, with a larger one at the end of the cell; a few fuscous streaks in the bone-white cilia, and a small fuscous shade at the base of the costa: ♂ with the discal and plical spots much more clearly exhibited and with an additional fuscous shade towards the end of the fold beneath the outer discal; the spotting around the termen and apex much more distinct and the costa slightly shaded throughout. Exp. al. 12—15 mm. Hindwings pale brownish grey; cilia pale brownish cinereous; ♂ without subcostal hair-pencil. Abdomen whitish. Legs whitish, the tarsi and outer sides of the hind tibiae shaded with pale fuscous bands.

Type ♀ (27750); ♂ (26763) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895; Mts., 3000—4000 ft., V. 1894. Two specimens.

Allied to *geminella* but without the distinct dark shades from the base and lacking the subcostal hair-pencil.

227. (91) *Hyposmocoma ossea*, sp. nov. (Pl. XXI. fig. 16).

Antennae cinereous. Palpi bone-white, the outer side of the median joint greyish fuscous nearly to its apex. Head and Thorax bone-white; the face somewhat flattened. Forewings bone-white, a short blackish streak along the extreme base of the costa, a brownish fuscous spot in the middle of the fold, a smaller one above and beyond it on the cell, a third at the end of the cell; cilia bone-whitish, with a slight greyish tinge; under side greyish fuscous. Exp. al. 16—17 mm. Hindwings and cilia grey; under side leaden grey; ♂ without subcostal hair-pencil. Abdomen grey, darker than the hindwings. Legs missing; (very pale cinereous, unmarked, in the paratype).

Type ♂ (25787) Mus. Wlsm.

Hab. Hawaii: Kona, 4000 ft., 4. vii.—9. viii. 1892. Two specimens.

228. (92) *Hyposmocoma argentea*, sp. nov. (Pl. XXI. fig. 17).

Antennae, ♂ minutely serrate, whitish, with a slight brownish ochreous tinge, basal joint white: ♀ pale ochreous, delicately barred above with brown. Palpi white, with a slight brownish shade on the basal half of the median joint externally (rarely entirely white). Head and Thorax silvery white. Forewings silvery white; sometimes with minute groups each consisting of two or three blackish scales, one on the cell about the middle, one before and below it about the middle of the fold, and one equidistant beyond it scarcely above the fold; cilia tinged with ochreous around the costa and termen; under side dark brownish grey, costa narrowly white throughout, cilia whitish. Exp. al. 18—20 mm. Hindwings rather pale grey; cilia pale brownish grey; under side pale grey, apical cilia whitish; ♂ without subcostal hair-pencil. Legs, anterior pair brownish grey; median and posterior pairs whitish.

Type ♂ (26123); ♀ (26189) Mus. Wlsm.

Hab. Molokai: (1) 22. v. 1893, 9. vi. 1893, vi. 1896, (1) 12. vii. 1893. Fourteen specimens.

This species differs from *subargentea* in the much paler median joint of the palpi, in the yellower cilia, especially at the tornus, and in the noticeably shorter and stouter abdomen.

229. (93) *Hyposmocoma subargentea*, sp. nov. (Pl. XXI. fig. 18).

Antennae pale ochreous, faintly annulate, basal joint white. Palpi white, the median joint smeared externally, nearly to its apex, with dark brown. Head and Thorax silvery white; face brown, with a few white scales at the base of the haustellum. Forewings silvery white, a minute brownish fuscous dot at the end of the cell, a group of two or three brownish scales in the middle of the fold, with a similar minute group on the cell above and beyond them; cilia silvery white, with a faint greyish suffusion about the tornus; under side dark leaden grey, costal and terminal cilia white. Exp. al. 18 mm. Hindwings rather dark grey; cilia pale brownish grey, tending to whitish about the apex; under side dark leaden grey, apical cilia white; ♂ without subcostal hair-pencil. Legs, anterior and median leaden grey; posterior pale brownish grey, tarsal joints faintly spotted with whitish.

Type ♂ (26867) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., VI. 1894. Unique.

This species differs from *argentea* in the dark face and more suffused median joint of the palpi; the cilia of the forewings are also whiter, and the abdomen is longer and more slender.

230. (94) *Hyposmocoma lactea*, sp. nov. (Pl. XXI. fig. 19).

Antennae, ♂ dark umber-brown; ♀ cream-white, annulate with umber-brown; basal joint cream-whitish, shaded with umber-brown. Palpi cream-white, an umber-brown shade along the outer side of the median joint. Head and Thorax cream-white; the tegulae touched with dark brown at the base. Forewings cream-white, with a narrow dark umber-brown shade along the costa from base to middle; a dark brown dorsal shade beyond the middle (in some varieties reduced to a few dark scales near the tornus); exceptionally with a dark spot in the fold or at the end of the cell; cilia cream-whitish (sometimes suffused with ochreous or brownish ochreous), tornal cilia greyish; underside greyish fuscous, costa and cilia whitish. Exp. al. 15—16 mm. Hindwings and cilia brownish grey; costal cilia whitish; ♂ with a pale greyish white subcostal hair-pencil. Abdomen greyish brown above, anal tuft and underside whitish. Legs, anterior blackish; posterior pale brownish ochreous, hind tarsi with brownish spots.

Type ♂ (27549); ♀ (27186) Mus. Wlsm.

HAB. KAUAI: Halemanu, 4000 ft., V. 1895; Mts., 3000—4000 ft., VI. 1894. Sixteen specimens.

231. (95) *Hyposmocoma lacticretella*, sp. nov. (Pl. XXI. fig. 20).

Antennae (♀) slightly serrate; dark tawny fuscous. Palpi chalk-white, dark tawny fuscous to near the end of the median joint externally, and around the apex of the terminal joint. Head and Thorax chalky white. Forewings chalky white, with a faint ochreous suffusion to beyond the middle, a narrow dark tawny fuscous streak runs along the costa to beyond the middle, and below its pointed outer extremity is a tornal patch of the same colour with a few sparsely scattered scales below the fold; cilia chalky whitish, with a grey shade-line in their middle about the tornus. Exp. al. 12 mm. Hindwings and cilia pale brownish cinereous. Abdomen brownish cinereous, anal tuft ochreous. Legs smoky fuscous, the basal half of the hind tibiae whitish.

Type ♀ (26693) Mus. Wlsm.

HAB. MAUI: Olinda (Haleakala), 4000 ft., IV. 1894. Unique.

232. (96) *Hyposmocoma persimilis*, sp. nov. (Pl. XXI. fig. 21).

Antennae white, faintly annulate with greyish brown; basal joint white. Palpi, median joint brownish fuscous nearly to its apex which is white; terminal joint white throughout, except a small brownish spot near its apex above. Head and Thorax white. Forewings white, with a small brownish spot at the base of the costa, a second costal spot before and a third beyond the middle, the last two somewhat elongate, the extreme costal margin very narrowly white above the outer one; there is a slight dusting of brownish fuscous scales in outwardly augulated lines, apparently in connection with these costal spots, but very thinly scattered except in two small groups on the dorsum, one before and one beyond the middle; a line of similar scales runs around the apex at the base of the white cilia which become brownish grey towards the tornus and are slightly sprinkled with brownish fuscous in that direction. Exp. al. 13—14 mm. Hindwings and cilia pale greyish brown; ♂ without subcostal hair-pencil. Abdomen greyish brown, anal segment inclining to ochreous. Legs whitish cinereous.

Type ♂ (25404); ♀ (27491) Mus. Wlsm.

Hab. Hawaii: Kona, 3500 ft., (4) 26—29. vi. 1892, 5000 ft., (1) 30. vi. 1892, 4000 ft., (7) vii., (5) 4—10. viii. 1892, 4000 ft. and upward, (2) ix. 1892. Nineteen specimens.

This species differs from *Hyposmocoma albonivea* in the white face and basal joint of the antennae, in the browner shade of the markings, and in the absence of a distinct tornal spot, as also in the almost wholly white terminal joint of the palpi and in the paler legs and tarsi. Varieties of *carbonenotata* which have the first and second dorsal spots obsolete may be distinguished by the black basal joint of the antennae, and by the subcostal hair-pencil in the ♂.

233. (97) *Hyposmocoma trimaculata*, sp. nov. (Pl. XXI. fig. 22).

Antennae dirty whitish, faintly barred above with brownish cinereous. Palpi whitish, the median joint almost entirely suffused with fuscous, the terminal joint with a fuscous ring before the apex. Head and face white. Thorax dirty white. Forewings white, sprinkled with brownish cinereous scales, more profusely on the dorsal third, beyond the end of the cell, and along the termen; on the costa are three elongate dark fuscous patches, one at the base narrowly connected with the second which extends a little beyond one-third, the third at about two-thirds; cilia dirty whitish, mottled with brownish cinereous. Exp. al. 11 mm. Hindwings and cilia pale brownish grey; ♂ with a pale brownish grey subcostal hair-pencil. Abdomen brownish grey. Legs pale greyish fuscous, dirty whitish on their inner sides and at the tarsal joints.

Type ♂ (25104); ♀ (25103) Mus. Wlsm.

HAB. OAHU: Waianae Mts., 2000 ft., IV. 1892. Two specimens.

The markings are much less distinct and the ground-colour more sordid than in *carbonenotata*, which moreover has the basal joint of the antennae black.

234. (98) *Hyposmocoma albonivea*, sp. nov. (Pl. XXI. fig. 23).

Antennae white, delicately annulate with sooty black; basal joint black. Palpi, median joint black, white at its extreme apex; terminal joint white, with a black spot at its base beneath, and a black ring before its apex. Head white; face black. Thorax and tegulae white. Forewings shining, snow-white, with a black spot at the base of the costa, another on the costa before the middle, a third, larger and more triangular, commencing scarcely beyond the middle and reaching to the costal cilia; below and beyond this is an obtusely triangular black dorsal spot at the outer extremity of the fold; the base of the white cilia about the apex and termen is sparsely peppered with black scales; tornal cilia brownish cinereous. Exp. al. 12 mm. Hindwings and cilia brownish cinereous. Abdomen dark brownish cinereous, anal segment ochreous. Legs brownish fuscous, with white spurs and tarsal spots; the long hairs above the hind tibiae whitish cinereous.

Type ♀ (26014) Mus. Wlsm.

HAB. OAHU: Waianae Mts., IV. 1892. Unique.

235. (99) *Hyposmocoma carbonenotata*, sp. nov. (Pl. XXI. fig. 24).

Antennae white, annulate with black; basal joint black. Palpi, median joint black, apex white; terminal joint white, with a black ring before the tip. Head and Thorax white, the latter with a black spot posteriorly and another at the base of the tegulae. Forewings white, with six black marginal streaks, three costal and three dorsal; the first costal streak is at the base, pointing obliquely outward parallel with the fold, somewhat wedge-shaped, a narrow black line along the extreme margin connects it with a narrow elongate costal spot at about one-third, also with a smaller wedge-shaped costal spot a little beyond the middle; on the dorsum are three wedge-shaped spots, all pointing obliquely outward, the first small, near the base, the second larger, scarcely before the middle, the third about the tornus and somewhat nearer to the apex than the outer costal spot above it; the white apical and terminal portions of the wing and the white cilia are sprinkled with blackish scales, the tornal cilia being brownish grey. Exp. al. 14 mm. Hindwings grey; cilia brownish grey; ♂ with a greyish subcostal hair-pencil. Abdomen dark brownish fuscous; ♂ with the anal segments large and blunt, lateral plates strongly developed. Legs brownish fuscous with white spurs, white tarsal annulations and whitish hairs on the hind tibiae.

Type ♂ (27144); ♀ (26973).

Hab. Kauai: Mts., 3000—4000 ft., (10) v.—vi. 1894; Halemanu, 4000 ft., (1) v. 1895. Eleven specimens.

The species varies slightly and in two specimens the first and second dorsal spots are almost obliterated.

236. (100) *Hyposmocoma alliterata*, sp. nov. (Pl. XXI. fig. 25).

Antennae white, annulate with brownish fuscous; basal joint brownish fuscous. Palpi white, the median joint with a brownish fuscous spot beneath at the base and a ring of the same colour before its apex; terminal joint with a brownish fuscous ring before its apex. Head white. Thorax white, with brownish fuscous spots posteriorly and on the tegulae. Forewings silvery white (sometimes with a greenish tinge), with distinct brownish fuscous markings; an oblong patch at the base of the costa; a rather longer patch at the base of the dorsum, its apex turning upward to the fold; a long boot-shaped streak from the costa at one-third, slightly dilated on the costa, extends obliquely outward, the heel crossing the fold, the toe obtusely terminated on the cell above in the direction of a costal spot at two-thirds; an elongate dorsal spot about the tornus, with a small spot at the end of the cell above it and a triangular patch at the apex running through the apical cilia; terminal cilia white, greyish about the tornus. Exp. al. 13—14 mm. Hindwings grey; cilia brownish grey; ♂ with a dark grey subcostal hair-pencil. Abdomen pale brownish cinereous; ♀ with the terminal segments greyish fuscous. Legs pale brownish cinereous, tarsi spotted with greyish fuscous.

Type ♂ (26151); ♀ (26200) *Molokai*, Mus. Wlsm.

Hab. Molokai: above 3000—4000 ft., (6) 5. v.—12. vi. 1893.—Maui: Haleakala, below 4000—5000 ft., (2) v. 1896.—Hawaii: Kona, 3500—5000 ft., (4) 29. vi.—4. vii. 1892. Twelve specimens.

237. (101) *Hyposmocoma nigrodentata*, sp. nov. (Pl. XXI. fig. 26).

Antennae black above, sprinkled with white scales; basal joint black, its apex white. Palpi white, sprinkled with black scales on the outer side of the median joint nearly to its apex; terminal joint also sprinkled with black and with a black ring at its base. Head and Thorax chalky white. Forewings chalky white, a black streak along the base of the costa, and another, at the base of the dorsum, are obliquely bent at their outer ends, converging in an acute angle at about one-fourth from the base, thus enclosing a white quadrangular basal patch; a little beyond one-third is a black costal patch, and another quadrate black patch at two-thirds; on the dorsum are two black outwardly oblique dentate patches, the outer one, before the tornus, reaching scarcely beyond the costal patch above it ; the apex and termen are narrowly black at the base of the blackish cilia which become grey towards the tornus. Exp. al. 11 mm. Hindwings and cilia pale, shining, brownish grey. Abdomen brownish grey. Legs whitish, with black tarsal annulations.

Type ♀ (26964) ; ♂ (26970) Mus. Wlsm.

HAB. KAUAI : Mts., 3000—4000 ft., v. 1894. Three specimens.

This species differs from *obliterata* in the dark cilia and the black margin to the termen and apex.

238. (102) *Hyposmocoma obliterata*, sp. nov. (Pl. XXI. fig. 27).

Antennae greyish fuscous, faintly annulate ; the end of the basal joint white. Palpi white, barred with greyish fuscous externally near the end of the median joint and near the base and tip of the terminal. Head and Thorax white. Forewings white, with a broken fuscous shade extending to three-fourths from the base and a few fuscous scales at the apex ; the fuscous shade is broken by a small white patch on the middle of the costa, by a small white patch at the base of the fold, and by two outwardly oblique dorsal patches, one before and another smaller one about the middle ; the outer edge of the dark shade is clearly defined against the white apical fourth and is slightly concave ; cilia white, becoming greyish about the tornus. Exp. al. 13 mm. Hindwings and cilia pale brownish grey. Abdomen fuscous. Legs whitish, the outer sides of the tibiae slightly shaded posteriorly.

Type ♂ (26965) ; ♀ (26971) Mus. Wlsm.

HAB. KAUAI : Mts., 3000—4000 ft., v. 1894. Three specimens.

In the ♀ the markings are blackish and the white dorsal patch extends broadly to the costa, where it is irrorated with blackish, leaving an angulated blackish basal patch clearly defined. Closely allied to *nigrodentata* but differing in the white cilia and in the absence of the black margin to the termen and apex.

239. (103) *Hyposmocoma bacillella*, sp. nov. (Pl. XXI. fig. 28).

Antennae greyish fuscous, the basal joint black. Palpi white, sprinkled with black externally and around the terminal joint. Head and Thorax chalk-white. Forewings chalk-white, with a blackish streak, sprinkled with white scales, running along the costa from the base nearly to the middle and sending off two outwardly oblique projections from its lower side, the first reaching the fold, but not the second ; at about half the wing-length is a black spot in the fold, above and a little beyond this is a black streak along the outer third of the cell, narrowly connected below its apex with a black spot about the tornus ; the apex and termen are mottled with dark fuscous, and the greater part of the wing-surface is sprinkled with the same, especially between the discal streak and the costa; cilia pale greyish cinereous. Exp. al. 11—12 mm. Hindwings and cilia pale greyish cinereous; ♂ with pale greyish subcostal tuft. Abdomen and Legs pale brownish cinereous, the tarsi faintly spotted with fuscous.

Type ♂ (27971) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (4) V. 1894; Halemanu and Kaholuamano, 4000 ft., Larva on "Lehua" (*Metrosideros polymorpha* ?) and other trees, IV. (1) excl. V. 1895. Five specimens.

In some varieties the wings are much suffused with blackish and fuscous, the white ground-colour being only noticeable as a few small spots near the base, two dorsal spots and an angulated fascia, formed by narrow streaks from the tornus and costa, beyond which the apical portion of the wing is more or less suffused with brown. In these varieties the second projection from the blackish costal streak being surrounded by white becomes somewhat conspicuous, as also the thorax which is creamy white.

The larva lives in an elongate conical case, with overlapping lip at the anterior end, the narrower posterior end being obtuse and the whole case having much the appearance of a piece of birch bark, but somewhat darker on the upper than on the under side, the division between the darker and lighter portions being straight and clearly defined. For pupation the case is attached by a short, stiff, thick silken stem from the middle of its underlip to the midrib of the leaf. The case is suspended parallel with the plane of the leaf, two or three fine silk threads attaching its anal extremity to the leaf.

240. (104) *Hyposmocoma canella*, sp. nov. (Pl. XXII. fig. 1).

Antennae greyish fuscous, with faint paler annulations, the basal joint hoary. Palpi, Head and Thorax hoary white, sprinkled with fuscous. Forewings hoary white, sprinkled and spotted with greyish fuscous, the base of the costa slightly suffused; in some specimens the fuscous spotting indicates two discal spots with a plical spot below and between them, also one or two others beyond the end of the cell, but in other specimens these are more or less obliterated by coalescence; cilia hoary white, shaded with fuscous along their basal half which shows a tendency to division into two spots, but these are not clearly defined. Exp. al. 9—10 mm. Hindwings pale grey; cilia pale brownish grey; ♂ without subcostal hair-pencil. Abdomen hoary whitish, shaded with fuscous. Legs whitish, the tarsi speckled with fuscous.

Type ♂ (26313); ♀ (26148) *Molokai*, Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (1) V. 1894.—OAHU: Waianae Mts., above 1600 ft., (7) IV. 1892; Mt. Kaala, 1500 ft., (1) III. 1892.—MOLOKAI: 3000 to above 4000 ft., (3) 30. V.—VI. 1893, (2) 6—16. IX. 1893.—HAWAII: Kona, 5000 ft., (1) 30. VI. 1892. Fifteen specimens.

241. (105) *Hyposmocoma schismatica*, sp. nov. (Pl. XXII. fig. 2).

Antennae dark fuscous. Palpi dark fuscous, sprinkled with whitish ochreous, especially on their inner sides. Head light ochreous, the face even paler. Thorax dark fuscous, tegulae edged with pale ochreous. Forewings dark fuscous, slightly speckled with whitish ochreous, a broad dorsal streak, varying from light ochreous to whitish ochreous, is sometimes traceable to the base, but more usually cut off somewhat abruptly at the flexus; it throws up a slight excrescence before the dark plical spot, this and the discal spots above it being always more or less apparent; a small ochreous spot lies on the costa at four-fifths, and an opposite one on the dorsum terminating the dorsal streak; a few pale scales around the termen at the base of the greyish fuscous cilia, which become paler on the dorsum, but do not take the colour of the dorsal streak. Exp. al. 11—13 mm. Hindwings grey; cilia brownish grey; ♂ without subcostal hair-pencil. Abdomen fuscous. Legs brownish grey, faintly speckled.

Type ♂ (27600); ♀ (27965) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895. Thirteen specimens.

This species varies in the tint of the pale dorsal streak, which is sometimes almost whitish, sometimes distinctly ochreous. It differs from *metrosiderella* in the absence of the subcostal hair-pencil and from *modesta* in the uneven edge of the dorsal streak and in the more speckled appearance of the darker portions of the wing; the face is however always pale, whereas in *modesta* it is if anything darker than the crown.

242. (106) *Hyposmocoma cinereosparsa*, sp. nov. (Pl. XXII. fig. 3).

Antennae fuscous, faintly annulate. Palpi fuscous, sprinkled with whitish cinereous, a ring of the same around the apex of the median joint. Head whitish cinereous, sprinkled with fuscous above; face whitish cinereous. Thorax fuscous, tegulae sprinkled with whitish cinereous. Forewings fuscous, profusely sprinkled with whitish cinereous scales which are somewhat concentrated along the dorsum and below the outer end of the cell, also on the costa at the commencement of the cilia; a plical and two discal dark fuscous spots are visible, the second discal being at the end of the cell; cilia brownish grey above the tornus, mixed fuscous and whitish cinereous tipped with brownish grey about the termen and apex. Exp. al. 13—14 mm. Hindwings grey, cilia brownish grey; ♂ without subcostal hair-pencil. Abdomen brownish grey. Legs brownish grey, the tarsi banded with fuscous and spotted with whitish cinereous at the joints.

Type ♂ (27104); ♀ (26883) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (1) IV. 1895; Mts., 3000—4000 ft., (17) VI. 1894. Eighteen specimens.

243. (107) *Hyposmocoma saccophora*, sp. nov. (Pl. XXII. fig. 4).

Antennae brown; the basal joint enlarged outwardly, with a pale yellowish cinereous ring around its apex. Palpi pale cinereous, blotched with brown externally. Head dark brown; face shining, dark brownish grey. Thorax dark brown. Forewings dark brown (through the very dense sprinkling of dark scales on a pale cinereous ground), with an indication of two slightly darker fuscous spots on the fold, one before and one behind its middle, a very small dark spot lying also at the end of the cell; the outer third of the costa to the apex is very narrowly pale yellowish cinereous and a few scales of the same colour are visible on the opposite margin at the base of the tornal cilia (in some specimens these spots are connected by a sprinkling of whitish cinereous scales); cilia dark brown, with a slightly speckled appearance. Exp. al. 8—10 mm. Hindwings brownish grey; cilia brownish; ♂ without subcostal hair-pencil. Abdomen brown. Legs pale cinereous, the tarsi banded with greyish brown.

Type ♀ (25062); ♂ (25904) *Oahu*, Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., (1) v. 1894.—Oahu: Waianae Mts., (3) iv. 1892; near head of Kawailoa Gulch, larva in case on lichen-stained rock, (3) excl. iv. 1893; Mt. Kaala, 3000 ft., larva in case on almost bare rock, no doubt lichenivorous, (1) excl. iv. 1892.—Molokai: above 3000 ft., (1) 13. vi. 1893. Nine specimens.

The larval case is in the form of a somewhat stout thorn; whitish, mottled with greyish fuscous, and with a straight opening at the larger extremity, which is fitted with a lid, like the operculum of a univalve mollusc.

244. (108) *Hyposmocoma modesta*, sp. nov. (Pl. XXII. fig. 5).

Antennae fuscous. Palpi fuscous, with a pale ochreous ring around the apex of the median joint. Head fuscous, with a slight fawn-ochreous tinge above; face fuscous. Thorax fuscous, tinged with fawn-ochreous. Forewings dark tawny fuscous, with a slight indication of two dark spots, one on the fold, the other at the end of the cell, the anterior discal spot can also be faintly traced; from the base a rather broad fawn-ochreous streak occupies the dorsal area beneath the fold and tapering outward terminates in a slight enlargement at the tornus; the greyish fuscous terminal cilia are also tinged along their base with ochreous and there is a small spot of the same colour in the commencement of the costal cilia. Exp. al. 12 mm. Hindwings and cilia pale brownish grey; ♂ without subcostal hair-pencil. Abdomen brownish fuscous, tinged with ochreous posteriorly. Legs brownish fuscous, with some obscure pale ochreous tarsal spots.

Type ♂ (27022); ♀ (27014) Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., (8) vi. 1894; Halemanu, 4000 ft., (1) v. 1895. Nine specimens.

This species differs from *schismatica* in the straight dorsal streak throwing up no uneven anterior edge and especially in the dark face and the distinct pale ring around the dark palpi. It differs from *metrosiderella* in the absence of the subcostal hair-pencil.

245. (109) *Hyposmocoma tomentosa*, sp. nov. (Pl. XXII. fig. 6).

Antennae whitish, barred with fuscous. Palpi white, the median joint much shaded and sprinkled with fuscous, the terminal joint sparsely sprinkled. Head white. Thorax white in the middle, greyish fuscous at the sides. Forewings greyish fuscous, profusely sprinkled with mealy white scales as far as the brownish grey cilia; a white dorsal streak from base to tornus. Exp. al. 14 mm. Hindwings grey; cilia brownish grey. Abdomen mealy white, tinged with grey posteriorly. Legs whitish, shaded and banded with grey.

Type ♀ (25379) Mus. Wlsm.

Hab. Hawaii: Mt. Kilauea, vii. 1895; Kona, 3000 ft., ix. 1892. Two specimens.

246. (110) *Hyposmocoma dorsella*, sp. nov. (Pl. XXII. fig. 7).

Antennae umber-brown. Palpi brownish fuscous externally, whitish ochreous on the inner side of the median joint and around its apex; the terminal joint also sprinkled with whitish ochreous. Head and Thorax whitish ochreous; tegulae shaded with brownish fuscous. Forewings whitish ochreous, shaded, except in a broad band along the dorsum, with brownish fuscous, in which are clearly distinguishable an elongate plical spot on the middle of the fold, a longer discal spot or streak above and beyond it and a transverse spot at the end of the cell; these are much darker in colour than the wing-shading, a few dark spots along the base of the cilia on either side of the apex; cilia whitish ochreous. Exp. al. 17 mm. Hindwings pale stone-grey; cilia pale ochreous; ♂ without subcostal hair-pencil. Abdomen brownish ochreous, more distinctly in patches on the anterior segments. Legs whitish ochreous, shaded and banded with pale brownish fuscous.

Type ♂ (25109) Mus. Wlsm.

Hab. Oahu: Waianae Mts., 3000 ft., iv. 1892. Unique.

247. (111) *Hyposmocoma fallacella*, sp. nov. (Pl. XXII. fig. 8).

Antennae greyish brown. Palpi greyish white, with a fuscous shade on the basal half of the median joint externally and a spot at the base of the terminal joint. Head and Thorax dull whitish; tegulae brownish grey. Forewings greyish brown, with a pale whitish ochreous streak along the dorsum, including the terminal cilia nearly to the apex. Exp. al. 16 mm. Hindwings pale greyish; cilia brownish grey; ♂ with expansible greyish subcostal hair-pencil. Abdomen dull greyish. Legs whitish cinereous, the tarsi slightly grey-shaded.

Type ♂ (27065) Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., vi. 1894. Unique.

248. (112) *Hyposmocoma falsimella*, sp. nov. (Pl. XXII. fig. 9).

Antennae bronzy brown. Palpi bronzy brownish, inclining to pale brassy ochreous on their inner sides and externally at the junction of the median and terminal joints. Head pale brassy ochreous. Thorax bronzy brown. Forewings bronzy brown, with a pale brassy ochreous dorsal streak from base to tornus, influencing the tornal but not the apical cilia; with three subovate dark brown spots, one on the middle of the fold, one a little beyond it on the disc, and one at the end of the cell. Exp. al. 18 mm. Hindwings very pale greyish; cilia pale brownish ochreous; ♂ without subcostal hair-pencil. Abdomen and Legs pale brownish grey, the tarsi slightly darker externally.

Type ♂ (26648) Mus. Wlsm.

Hab. Maui: Haleakala, above 5000 ft., iii. 1894. Unique.

This species, which bears a strong resemblance to *Monopis imella*, Hb., is closely allied to *fallacella*, from which it differs essentially in lacking the subcostal hair-pencil and in its darker palpi.

249. (113) *Hyposmocoma ochreovittella*, sp. nov. (Pl. XII. fig. 10).

Antennae tawny brownish, faintly annulate with pale ochreous. Palpi pale cinereous, shaded, especially on the terminal joint, which is longer than the median, with tawny brownish. Head tawny brownish; face pale ochreous. Thorax pale brownish ochreous. Forewings tawny brownish, faintly mottled with pale ochreous, the whole space beneath the fold pale brownish ochreous; this colour, slightly crossing the fold beyond and before its middle, defines the outer edges of two rather dark plical spots; a spot at the end of the cell and another discal spot preceding it are faintly indicated in a darker shade of the ground-colour; cilia brownish ochreous, shading to greyish brown. Exp. al. 16—18 mm. Hindwings pale grey; cilia slightly paler; ♂ without subcostal hair-pencil, but with a strong outstanding pale brownish ochreous hair-pencil arising from the limbus near the base. Abdomen brownish. Legs brownish ochreous, hind tarsi with darker spots.

Type ♂ (25492); ♀ (25619) Mus. Wlsm.

Hab. Hawaii: Kona, 4000 ft., vi.—viii., ix. 1892. Twelve specimens.

The limbal hair-pencil arises on the upper side of the wing but is sometimes folded underneath; this structure does not occur in *fulvida*, *quadripunctata* and *vicina*, three allied species, which it is difficult otherwise to distinguish from *ochreovittella*.

250. (114) *Hyposmocoma quadripunctata*, sp. nov. (Pl. XXII. fig. 11).

Antennae tawny brownish. Palpi tawny brown, the terminal joint and a spot at the apex of the median joint inclining to ochreous, especially on the upper side. Head and Thorax tawny brown. Forewings tawny brown, with a vinous gloss, inclining to fade to brownish ochreous along the dorsum; a dark fuscous spot in the fold beyond its middle is followed by a smaller one a little above the fold; between and above these is one on the cell followed by a fourth at the end of the cell—all these are more or less annulate with pale brownish ochreous; cilia tawny brown, faintly streaked with pale brownish ochreous. Exp. al. 19 mm. Hindwings shining, pale grey; cilia brownish cinereous; ♂ without subcostal hair-pencil. Abdomen brownish cinereous. Legs brownish cinereous, tarsi with pale spots at the joints.

Type ♂ (26937); ♀ (26922) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., V. 1894. Two specimens.

251. (115) *Hyposmocoma sudorella*, sp. nov. (Pl. XXII. fig. 12).

Antennae greyish brown. Palpi greyish brown, the terminal joint narrowly ochreous above. Head and Thorax tawny brown. Forewings tawny brown, with a smooth glossy appearance; a tawny fuscous spot, a little beyond the middle of the fold, is followed by an obliquely reduplicated spot on the cell above it, with another on the end of the cell; cilia greyish brown. Exp. al. 18 mm. Hindwings shining, whitish grey; cilia greyish brown; ♂ without subcostal hair-pencil. Abdomen greyish brown. Legs pale greyish brown.

Type ♂ (26923) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895; Mts., 3000—4000 ft., V.—VI. 1894. Three specimens.

This species has slightly broader hindwings than *fulvida* and is a little larger, but it approaches very closely in appearance to some varieties of that species.

252. (116) *Hyposmocoma vicina*, sp. nov. (Pl. XXII. fig. 13).

Antennae fuscous, the basal joint with an ochreous ring at its apex. Palpi fuscous, but tinged with pale ochreous to beyond the middle of the median joint externally; the inner side of the median joint also tinged with ochreous throughout. Head and Thorax tawny fuscous, an ochreous tinge on the latter posteriorly; face dull ochreous. Forewings dark tawny fuscous, mottled with ochreous along the fold and across the middle of the wing, two opposite marginal spots faintly indicated beyond the end of the cell, which is occupied by a round faintly ocellate spot; cilia ochreous, much shaded with fuscous nearly to their extremities. Exp. al. 14—15 mm. Hindwings shining, pale brownish grey, slightly darker towards the apex; cilia brownish grey; ♂ without subcostal hair-pencil. Abdomen greyish fuscous, with paler transverse bands posteriorly. Legs brownish cinereous, the tarsi broadly annulate with tawny fuscous.

Type ♂ (25052); ♀ (25053) Mus. Wlsm.

HAB. OAHU: Waianae Mts., 1700 ft.: on trunks of more or less decayed koa trees (*Acacia koa*), IV. 1892; near head of Kawailoa Gulch, (1) IV. 1893. Nine specimens.

This species can be distinguished from *fulvida* by the paler median joint of the palpi, which in the latter have not the same pale ochreous tinge; moreover there is much more yellow-ochreous mottling on the wing-surface than in *fulvida*. The whole series of specimens from the same locality agree in these respects, but a single specimen might possibly have been regarded as a mere variety.

253. (117) *Hyposmocoma fulvida*, sp. nov. (Pl. XXII. fig. 14).

Antennae tawny brown; basal joint with a pale spot at its apex. Palpi tawny brown, with a pale spot at the apex of the median joint. Head and Thorax tawny brown. Forewings tawny brown, with three somewhat obscurely indicated dark tawny fuscous spots, one on the middle of the fold, one on the cell a little beyond and above it, and a third at the end of the cell, with a faint indication of a smaller spot a little above the fold at one-third from the base; cilia tawny brown, tending to greyish brown about the tornus. Exp. al. 14—16 mm. Hindwings brownish grey; cilia pale greyish brown; ♂ without subcostal hair-pencil. Abdomen tawny brown. Legs tawny brownish, with pale spurs and indistinct tarsal spots.

Type ♂ (26117); ♀ (26277) *Molokai*, Mus. Wlsm.

HAB. MOLOKAI: above 3000 to about 4000 ft., (3) 9—13. VI. 1893.—KAUAI: Kaholuamano, 4000 ft., (1) IV. 1895; Mts., 3000—4000 ft., (14) V.—VI. 1894. Eighteen specimens.

This species has thinner palpi and thicker hind tarsi than *vicina*.

254. (118) *Hyposmocoma sideritis*, sp. nov. (Pl. XXII. fig. 15).

Antennae fuscous, with faint brownish ochreous annulations. Palpi cinereous, shaded externally with fuscous, a ring of the same near the end of the median joint. Head tawny brown; face pale cinereous. Thorax tawny brown. Forewings tawny brown, with a slight bronzy gloss; cilia smoky brownish grey. Exp. al. 14 mm. Hindwings and cilia brownish grey; ♂ with brownish ochreous subcostal hair-pencil. Abdomen smoky grey. Legs brownish ochreous, with smoky grey hairs on the hind tibiae.

Type ♀ (28545); ♂ (26628) Mus. Wlsm.

HAB. MAUI: Olinda (Haleakala), 4000 ft., IV. 1894, V. 1896. Two specimens.

255. (119) *Hyposmocoma obscura*, sp. nov. (Pl. XXII. fig. 16).

Antennae brown, a pale ochreous spot at the end of the basal joint. Palpi, apical joint as long as the median, bronzy brown, the median joint with strongly iridescent scales externally. Head and Thorax dark bronzy brown. Forewings bronzy brown, apparently without markings, but on close examination a minute darker spot is visible on the middle of the fold with a few pale brownish ochreous scales at its outer extremity; above and a little beyond this is a similar darkened spot on the cell from which a slender line of pale brownish ochreous scales runs to a third spot at the end of the cell (these scales are probably very fugitive, as they have almost entirely disappeared from the right wing of 26668); cilia bronzy brown, slightly paler than the wing. Exp. al. 14—18 mm. Hindwings shining, brownish grey; cilia pale bronzy brownish; ♂ without subcostal hair-pencil. Abdomen greyish brown. Legs bronzy brownish, the hind tibiae iridescent at their sides, hairy above, pale cinereous at their extremities; the hind tarsi faintly spotted with pale cinereous.

Type ♀ (26668); ♂ (26676) Mus. Wlsm.

HAB. MAUI: Haleakala, 4000—5000 ft., III. 1894, V. 1896; Olinda (Haleakala), 4000 ft., IV. 1894, V. 1896. Seven specimens.

In paler specimens the spots are more distinct.

256. (120) *Hyposmocoma scandens*, sp. nov. (Pl. XXII. fig. 17).

Antennae dark brownish cinereous, a small pale spot at the end of the browner basal joint. Palpi greyish fuscous, paler greyish on their inner sides. Head and Thorax cinereous, mixed with dark brown scales. Forewings dark bronzy brown, a fuscous shade at the base of the dorsum; with four dark fuscous spots, one on the disc about the middle, coalescing with one which precedes it on the fold, one at the end of the cell and another half-way between this and the discal spot on the upper edge of the fold; a few whitish scales on the disc and on the fold between the discal and plical spots; cilia obscurely streaked with pale ochreous and bronzy brown. Exp. al. 17—20 mm. Hindwings whitish grey; cilia pale brownish grey; ♂ without subcostal hair-pencil. Abdomen grey. Legs pale cinereous, the tarsi much shaded with fuscous.

Type ♂ (27084); ♀ (26715) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (5) V.—VI. 1894; Lihue, 4000 ft., (1) VII. 1896. Six specimens.

257. (121) *Hyposmocoma maestella*, sp. nov. (Pl. XXII. fig. 18).

Antennae brownish ochreous beneath, fuscous above. Palpi bronzy brownish externally, the terminal joint brownish fuscous. Head and Thorax brownish ochreous. Forewings rather shining, rich bronzy brown, with two dark fuscous discal spots, one about the middle of the wing, the other at the end of the cell, a few pale cinereous scales between them; a smaller fuscous spot below these on the upper edge of the fold is preceded by a larger one in the middle of the fold; cilia fuscous at the apex, alternating with fuscous and plain cinereous on the costa and termen. Exp. al. 21—25 mm. Hindwings shining, grey; cilia pale brownish cinereous; ♂ without subcostal hair-pencil. Legs greyish brown, with pale tarsal annulations.

Type ♂ (27583); ♀ (27648) Mus. Wlsm.

Hab. Kauai: Kaholuamano, 4000 ft., iv. 1895. Twelve specimens.

258. (122) *Hyposmocoma fulvocervina*, sp. nov. (Pl. XXII. fig. 19).

Antennae pale ochreous. Palpi, terminal joint slightly longer than the median; blackish, pale ochreous at the end and on the inner side of the median joint. Head and Thorax purplish fawn. Forewings purplish fawn, with a narrow blackish spot on the middle of the fold, above and a little beyond which is another blackish spot followed by a larger one at the end of the cell; associated with these discal spots are some pale ochreous scales which sometimes almost surround them giving an ocellated appearance; three or four obscure greyish spots occur on the costa and termen; cilia fawn-ochreous. Exp. al. 17—21 mm. Hindwings shining, pale grey; cilia brownish grey; ♂ without subcostal hair-pencil. Abdomen brownish grey; anal tuft ochreous. Legs whitish ochreous, with brownish tarsal and tibial shade-bands externally.

Type ♂ (27829); ♀ (27361) Mus. Wlsm.

Hab. Kauai: Kaholuamano, 4000 ft., (10) iv. 1895; Mts., 3000—4000 ft., (3) v. 1894, (4) vi. 1894. Seventeen specimens.

The peculiar coloration and ocellated discal spots renders this species easy of recognition.

259. (123) *Hyposmocoma carnea*, sp. nov. (Pl. XXII. fig. 20).

Antennae yellowish ochreous, annulate with fuscous. Palpi fuscous externally, pale on their inner sides, with a slight pale annulus around the apex of the median joint. Head and Thorax pale rosy fawn. Forewings pale rosy fawn, minutely speckled with pale fuscous (with a yellowish ochreous tint wherever the scales are slightly abraded); cilia pale rosy fawn. Exp. al. 19 mm. Hindwings shining, whitish stramineous; cilia pale rosy; ♂ without subcostal hair-pencil. Abdomen and Legs pale fawn-ochreous.

Type ♂ (26902) Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., v.—vi. 1894. Two specimens.

This species differs from *roseofulva* in its decidedly broader hindwings, in its shorter palpi and in its paler coloration.

260. (124) *Hyposmocoma roseofulva*, sp. nov. (Pl. XXII. fig. 21).

Antennae brownish ochreous, the basal joint with a fuscous streak above. Palpi pale ochreous, a fuscous line along the outer side of the median joint, and a slender fuscous line along the outer side of the terminal joint. Head and Thorax dark tawny, the latter shading to tawny fuscous posteriorly. Forewings rich reddish tawny, shading to tawny fuscous along the dorsum, the costal and terminal veins being faintly indicated by lines of tawny fuscous scales; a large tawny fuscous spot on the disc about the middle of the wing, more or less blending with the dark dorsal shade, is followed by a smaller spot at the end of the cell; cilia around the apex reddish tawny, with a broken tawny fuscous line along their base, tornal cilia pale cinereous. Exp. al. 17—19 mm. Hindwings shining, pale grey; cilia pale cinereous; ♂ without subcostal hair-pencil. Abdomen cinereous. Legs pale brownish cinereous.

Type ♂ (27081); ♀ (27209) Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., v.—vi. 1894. Twelve specimens.

261. (125) *Hyposmocoma subsericea*, sp. nov. (Pl. XXII. fig. 22).

Antennae pale fawn, shaded with brownish fuscous. Palpi very pale fawn-ochreous, a dark shade along the under side of the terminal joint. Head and Thorax pale fawn-ochreous. Forewings rather shining, pale fawn-ochreous, dusted with fuscous atoms; a blackish spot on the middle of the fold, another somewhat elongate above and a little beyond it, a third at the end of the cell; at the base are two small fuscous spots, one below the fold, the other on the costa, a third, smaller one, is indicated between these two but removed from the base; cilia a little paler than the wing, with a few faintly indicated dark shade-spots along their base around the apex and termen. Exp. al. 18—24 mm. Hindwings shining, pale greyish; cilia with a slight fawn-ochreous tinge; ♂ without subcostal hair-pencil. Abdomen pale ochreous. Legs very pale fawn-ochreous, the tarsal joints shaded above with fawn-brownish.

Type ♂ (26360) *Molokai*, Mus. Wlsm.

Hab. Kauai: Halemanu, 4000 ft., (1) v. 1895.—Molokai: 4000 ft., (1) 23. ix. 1893.—Lanai: above 2000 ft., (1) xii. 1893.—Hawaii: Mt. Kilauea, (1) vi. 1895, (1) viii. 1896. Five specimens.

The species varies in size and in the amount of shading on the forewings being more or less distinctly indicated. One of the specimens from Hawaii (27406) has paler hindwings and the dark shade on the palpi is absent, but I cannot venture to separate it, having only one specimen in moderate condition. It is to be regretted that no series of specimens is available from any of the islands.

262. (126) *Hyposmocoma ochreocervina*, sp. nov. (Pl. XXII. fig. 23).

Antennae fawn-ochreous, the basal joint fuscous. Palpi fawn-ochreous, the median joint fuscous externally. Head and Thorax fawn-ochreous. Forewings fawn-ochreous, with a minute fuscous spot, a little above the fold, somewhat beyond its middle, a second minute spot at the end of the cell; above and below this the costal and dorsal margins show patches of fuscous scales, a few of the same being scattered along the termen and apex at the base of the pale fawn-ochreous cilia; at the extreme base of the costa is a narrow fuscous shade followed by another a little beyond it. Exp. al. 12—13 mm. Hindwings shining, pale grey; cilia with a slight brownish ochreous tinge; ♂ without subcostal hair-pencil. Abdomen cinereous. Legs pale cinereous, the tarsi with faint darker bands.

Type ♂ (25159); ♀ (25157) Mus. Wlsm.

Hab. Oahu: Waianae Mts., about 3000 ft., iv. 1892, "beaten from Lehua" trees (*Metrosideros polymorpha*?). Eight specimens.

263. (127) *Hyposmocoma syrrhaptes*, sp. nov. (Pl. XXII. fig. 24).

Antennae pale ochreous, barred above with brownish fuscous. Palpi pale ochreous, dark brownish fuscous externally on the median joint nearly to its apex. Head pale fawn-ochreous. Thorax fawn-ochreous. Forewings fawn-ochreous, with a broad dark brownish fuscous shade, along their upper third, extending from the base to the costal cilia and almost concealing a fuscous spot, at the end of the cell, as well as the preceding discal spot, but not extending to the fold; along the termen and reaching to the apex is a less distinct shade of the same colour, sometimes almost absent; cilia fawn-ochreous. Exp. al. 12 mm. Hindwings and cilia pale brownish fuscous; ♂ without subcostal hair-pencil. Abdomen fuscous. Legs pale brownish fuscous, with paler tarsal spots.

Type ♂ (27125); ♀ (27543) Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., v.—vi. 1893; Halemanu, 4000 ft., v. 1895. Four specimens.

264. (128) *Hyposmocoma paradoxa*, sp. nov. (Pl. XXII. fig. 25).

Antennae pale ochreous, barred above with brownish fuscous. Palpi pale ochreous, dark brownish fuscous externally on the median joint almost to its apex; terminal joint slightly sprinkled with fuscous, especially before its apex. Head pale fawn-ochreous. Thorax fawn-ochreous. Forewings fawn-ochreous, with a broad dark brownish fuscous shade along their upper third extending from the base to the apex, and to a distinct dark fuscous spot at the end of the cell preceded by another on the disc; the dark shade is slightly diffused beyond the cell, but sends down, before the middle, an angular projection to the position of the plical spot which is not otherwise distinguishable; the pale dorsal portion of the wing is obscurely irrorated with fuscous scales, the bases of the fawn-ochreous cilia as well as the cilia themselves being sometimes shaded with brownish fuscous. Exp. al. 11—12 mm. Hindwings and cilia pale leaden grey, with a brownish tinge outwardly; ♂ without subcostal hair-pencil. Abdomen fuscous. Legs pale brownish fuscous, with paler tarsal spots.

Type ♂ (27303); ♀ (27220) *Kauai*, Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., (1) v. 1894, (7) vi. 1894.—Molokai: above 3000 ft., (3) 13. vi. 1893, (1) 6. ix. 1893. Twelve specimens.

In *syrrhaptes* the dark costal shade reaches only to the two discal spots and to the costal cilia, while in *paradoxa* this shade reaches to the apex and throws down an angular projection to the plical spot. The palpi also differ slightly, but the two species are very closely allied.

265. (129) *Hyposmocoma mimema*, sp. nov. (Pl. XXII. fig. 26).

Antennae dark fuscous, a small ochreous ring at the end of the basal joint. Palpi pale ochreous, the median thickly, and the terminal joint slightly suffused with dark fuscous externally; a pale spot at the apex of the median joint. Head yellow-ochreous. Thorax blackish fuscous, an ochreous spot on the tegulae. Forewings bright yellowish ochreous, a blackish fuscous shade running from the base to the costal cilia, its lower edge biangulate, the angles reaching the disc but not to the fold; a sprinkling of fuscous scales about the apex, diffused inward towards the end of the cell, with a few also on the tornus at the end of the fold; without visible discal spots; cilia bright ochreous on the termen, tornal cilia brownish grey. Exp. al. 11 mm. Hindwings leaden grey; cilia brownish grey; ♂ with expansible dark grey subcostal hair-pencil. Abdomen dark brownish grey. Legs brownish grey, tarsi annulate with pale ochreous.

Type ♂ (28370) Mus. Wlsm.

Hab. Maui: Haleakala, below 4000—5000 ft., v. 1896. Two specimens.

This species is almost exactly similar to *syrrhaptes* in colour and markings but lacks the discoidal spot, while *syrrhaptes* has no subcostal hair-pencil.

266. (130) *Hyposmocoma bella*, sp. nov. (Pl. XXII. fig. 27).

Antennae cinereous, annulate with fuscous. Palpi (broken). Head leaden grey; face paler. Thorax dark purplish grey. Forewings dark purplish grey, with a bright yellow dorsal streak from base to apex, including the terminal cilia, a small yellow spot on the middle of the costa and a larger one at the commencement of the costal cilia; the upper edge of the dorsal streak is biundulate, the first undulation reaching the fold before its middle, the second extending to the end of the cell; costal cilia purplish grey. Exp. al. 9 mm. Hindwings and cilia tawny brownish. Abdomen dark grey. Legs (missing).

Type ♂ (27982) Mus. Wlsm.

HAB. KAUAI: Halemanu, 4000 ft., v. 1895. Unique.

The single specimen has no palpi and is in poor condition but is so remarkably distinct and beautiful in the contrast of its colours that I cannot refrain from describing it.

267. (131) *Hyposmocoma rusius*, sp. nov. (Pl. XXII. fig. 28).

Antennae fuscous. Palpi bright ochreous, terminal joint shaded with brownish fuscous. Head brownish fuscous; face whitish. Thorax bronzy brownish fuscous. Forewings bronzy brownish fuscous, with an indistinct ochreous gloss, especially noticeable from the middle of the base to half the wing-length, dilated upward to the middle of the costa and again in a broad band before the apex; the colours are so completely blended as to influence each other more or less throughout the wing and no distinct pattern can be recognised; a discal spot beyond the middle is almost obliterated, and another at the end of the cell is very minute; a few ochreous scales lie at the base of the dark bronzy fuscous cilia. Exp. al. 10 mm. Hindwings dark leaden grey; cilia tawny fuscous; ♂ without subcostal hair-pencil. Abdomen brownish fuscous. Legs bronzy grey, with obscure pale tarsal spots.

Type ♂ (26291) Mus. Wlsm.

HAB. MOLOKAI: above 3000 ft., 30. v. 1893. Unique.

268. (132) *Hyposmocoma auropurpurea*, sp. nov. (Pl. XXIII. fig. 1).

Antennae bronzy fuscous. Palpi bronzy golden, tipped with purplish. Head shining purple; face bronzy grey. Thorax shining purplish. Forewings shining purple, with a broad diffused bronzy golden streak running from the base along the fold, in which is a small dark spot, to the tornus and thence reverting obliquely outward to the costa before the apex; cilia purple. Exp. al. 9 mm. Hindwings and cilia rather iridescent, dark bronzy fuscous; ♂ without subcostal hair-pencil. Abdomen purplish. Legs bronzy fuscous.

Type ♂ (25085); ♀ (25083) Mus. Wlsm.

HAB. OAHU: Waianae Mts., 2000 ft., IV. 1892. Three specimens.

269. (133) *Hyposmocoma inversella*, sp. nov. (Pl. XXIII. fig. 2).

Antennae fuscous, the basal joint brownish ochreous. Palpi brownish ochreous; the terminal joint shorter than median. Head brilliant steel-blue above, brownish ochreous at the sides, the face pale ochreous. Thorax purplish; tegulae ochreous, touched with steel-blue at their base. Forewings shining purplish, with a small spot at the base of the costa and two transverse fasciae brownish ochreous; the first fascia leaves the costa at one-fifth from the base and is dilated to the dorsum, enclosing a purplish basal patch, which is slightly angulated outward a little above the fold; the second fascia is inverted from the commencement of the costal cilia, running obliquely to the commencement of the tornal cilia, its outer margin slightly concave; cilia cinereous. Exp. al. 11—12 mm. Hindwings and cilia tawny cupreous. Abdomen tawny fuscous. Legs tawny fuscous, with pale spurs and tarsal spots.

Type ♀ (25082) Mus. Wlsm.

HAB. OAHU: Waianae Mts., 2000 ft., IV. 1892. Two specimens.

270. (134) *Hyposmocoma vinicolor*, sp. nov. (Pl. XXIII. fig. 3).

Antennae reddish fuscous. Palpi cinereous, shaded and speckled with reddish fuscous externally. Head pale cinereous, with a few reddish fuscous scales. Thorax cinereous, dusted with reddish fuscous. Forewings whitish cinereous, profusely sprinkled with dark tawny scales, giving the appearance of a vinous suffusion; these are aggregated in a conspicuous dark tawny basal patch, somewhat convex outwardly, in a dark tawny patch resting on the fold beyond its middle and diffused upward and inward across the cell nearly to the costa, also in a small spot at the end of the cell; cilia brownish grey, sprinkled with tawny scales about their base, especially around the apex. Exp. al. 15 mm. Hindwings and cilia pale greyish brown. Abdomen dark greyish brown above, whitish beneath. Legs pale cinereous, somewhat dusted with tawny grey.

Type ♀ (25047) Mus. Wlsm.

HAB. OAHU: Waianae Mts., 3000 ft., IV. 1892. Two specimens.

271. (135) *Hyposmocoma adelphella*, sp. nov. (Pl. XXIII. fig. 4).

Antennae brown. Palpi brown, terminal joint paler than median. Head whitish ochreous, shaded above with brown. Thorax fawn-brown. Forewings fawn-brown, with the usual two dark discal spots, the first slightly elongate a little beyond the similar plical spot below it; cilia pale brown, a faint ochreous line running along their base. Exp. al. 14 mm. Hindwings pale brownish grey; cilia brownish grey; ♂ without subcostal hair-pencil. Abdomen and Legs brownish grey; hind tarsi faintly pale-spotted.

Type ♂ (25424); ♀ (25709) *Hawaii*, Mus. Wlsm.

Hab. Hawaii: Kona, 4000 ft., (2) 17. vii. 1892.—Kauai: Mts., 3000—4000 ft., (1) vi. 1894.

I am unable to separate from the Hawaiian species a single ♀ (27124) from Kauai.

272. (136) *Hyposmocoma metrosiderella*, sp. nov. (Pl. XXIII. fig. 5).

Antennae bronzy fuscous. Palpi blackish, with a pale ochreous ring around the apex of the median joint; terminal joint sprinkled with pale ochreous scales. Head and Thorax brownish cinereous. Forewings bronzy fuscous, the dorsal space below the fold, a spot at the lower angle of the cell, and another on the costa before the apex pale brownish ochreous, many scales of the same colour scattered about the wing-surface; on the dark suffused portion of the wing dark fuscous spots are ill-defined, these appear to be placed thus:—one overlapping the fold at one-third of its length, one in the fold at two-thirds of its length, one at the end of the cell, and one, before it on the cell, a little further from the base than the plical spot below it; cilia dull greyish ochreous. Exp. al. 11—13 mm. Hindwings brownish grey; cilia greyish ochreous; subcostal tuft of the ♂ leaden grey. Abdomen dull brownish ochreous. Legs dark tawny greyish, with whitish ochreous annulations at the joints.

Type ♂ (27972); ♀ (27974) *Kauai*, Mus. Wlsm.

Hab. Kauai: Kaholuamano, 4000 ft., (1) iv. 1895; Halemanu and Kaholuamano, 4000 ft., larva on *Metrosideros*, (8) excl. v. 1895; Mts., 3000—4000 ft., (2) v.—vi. 1894.—Oahu: Waianae Mts., (9) iv. 1892. Twenty-two specimens.

Varieties of this species occur in which there is less speckling and mottling, the darker spots being scarcely traceable, the dorsal space clearer, with a pale tornal spot opposite to that on the costa, and the abdomen of the ♂ appears to be also sometimes dark leaden grey above.

The larva feeds on *Metrosideros* (*polymorpha*?) in a rough case of frass with a loose lip. The case is somewhat flattened, pouch-shaped, with a short obtuse curved attenuation posteriorly, the middle is widened and the whole case is of a dull dark brownish and fuscous colour.

Hyposmocoma, sp. (*metrosiderella*?).

Hab. Maui: Haleakala, 5000 ft., iii. 1894.

A single specimen from Maui (26596) is not sufficiently distinct from *metrosiderella* to warrant description.

273. (137) *Hyposmocoma similis*, sp. nov. (Pl. XXIII. fig. 6).

Antennae pale fuscous; basal joint pectinate. Palpi recurved to above the vertex, terminal joint as long as median; median joint blackish, sprinkled with whitish scales, a white ring around its apex; terminal joint creamy whitish, sprinkled with black. Head white, shaded with fuscous above in the middle. Thorax fuscous, whitish across the anterior margin. Forewings white, as to their ground-colour, but the whole surface above the fold suffused with fuscous, rendering the markings, which are as in *calva*, much less clearly defined than in that species; the cilia have a very slight ochreous tinge. Exp. al. 16 mm. Hindwings bronzy grey; the cilia with a scarcely perceptible ochreous tinge; ♂ with a greyish subcostal hair-pencil. Abdomen grey, anal extremity whitish cinereous (not ochreous). Legs whitish, sprinkled with grey.

Type ♂ (25238) Mus. Wlsm.

Hab. Hawaii: Kona, 4000 ft., (1) vii. 1892, (1) 12. viii. 1892, (1) 17. viii. 1892. Three specimens.

This species greatly resembles *calva* but the colour of the head at once separates it, accompanied as this is by the other slight differences mentioned, especially the absence of any distinct yellowish ochreous tint in the cilia of the fore and hindwings.

274. (138) *Hyposmocoma calva*, sp. nov. (Pl. XXIII. fig. 7).

Antennae pale fuscous. Palpi, median joint blackish, sprinkled with whitish scales, a white ring around its apex; terminal joint creamy whitish, sprinkled with black. Head pale ochreous. Thorax fuscous. Forewings white, much sprinkled and blotched with fuscous, of which an outwardly angulated basal patch becomes almost confluent with a profuse subcostal sprinkling, and a large ill-defined plical spot, about the middle of the fold, becomes almost confluent with a discal spot above and beyond it, which again is followed by another at the end of the cell, the apex also is clouded with fuscous; the dorsal space below the fold is white, on which only a small portion of the basal patch, a portion of the plical spot, and a few antetornal fuscous scales encroach; cilia greyish ochreous, slightly speckled with fuscous. Exp. al. 17 mm. Hindwings bronzy grey, paler at the base; cilia greyish, with an ochreous tinge; ♂ with greyish subcostal hair-pencil. Abdomen fuscous, anal segments ochreous. Legs whitish ochreous, sprinkled with grey.

Type ♂ (25227) Mus. Wlsm.

Hab. Hawaii: Kona, 4000 ft., 12—17. viii. 1892. Two specimens.

275. (139) *Hyposmocoma tarsimaculata*, sp. nov. (Pl. XXIII. fig. 8).

Antennae dark fuscous, the basal joint with a few white scales at its apex. Palpi black, the end of the median joint white; terminal joint sprinkled with white. Head whitish, shaded with brownish fuscous above. Thorax black, sprinkled with white posteriorly, the tegulae tipped with ochreous. Forewings white, much sprinkled and suffused with black; an oblique black basal patch, wider on the dorsum than on the costa, communicates with a blackish dorsal shade which extends to the tornus where it meets a transverse black fascia, sprinkled and diffused on its inner margin, but clearly defined by a white band externally; at about one-third from the base is a black costal shade, attenuate obliquely downward to the fold, thence produced outward in an elongate reniform spot crossing the fold; before the apex is a black transverse shade, formed of thickly sprinkled scales which extend also through the white terminal cilia; tornal cilia brownish grey. Exp. al. 16—17 mm. Hindwings shining, pale grey; cilia brownish grey; ♂ with a blackish subcostal hair-pencil. Abdomen brownish grey. Legs white, tarsi with four black bands above, tibiae shaded with black externally; hind tibiae with long brownish grey hairs above.

Type ♂ (27321) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (3) VI. 1894.—OAHU: Near head of Kawailoa Gulch, (1) IV. 1893. Four specimens—those from Kauai are all males, the Oahu specimen is a ♀.

276. (140) *Hyposmocoma ochreociliata*, sp. nov. (Pl. XXIII. fig. 9).

Antennae pale cinereous, banded above with olive-grey. Palpi fuscous, much sprinkled with whitish scales, the apex of the median joint whitish. Head whitish, sprinkled with greyish fuscous. Thorax bright orange-ochreous, sprinkled and suffused with fuscous anteriorly. Forewings slaty whitish, much suffused above the dorsum, beyond the basal third, with olivaceous fuscous extending to the costa and apex; a basal patch of the same colour, containing some slightly raised scales, is irregularly edged externally with dark coppery fuscous, angulated on the fold and with some orange-ochreous scales along its dorsal margin; at the commencement of the fuscous suffusion is a large oblique patch of dark coppery fuscous, arising beneath the costa and slightly overlapping the fold, followed by a strong discal spot of the same colour, with another at the end of the cell, a tornal spot a little beyond the latter; the marginal spots before the apex are faintly indicated in the whitish ground-colour, the cilia throughout being bright orange-ochreous, sparsely speckled with greyish fuscous. Exp. al. 18 mm. Hindwings shining, grey; cilia orange-ochreous, shading to greyish about the tornus; subcostal hair-pencil rather dark grey. Abdomen dark greyish. Legs greyish, with ochreous annulations and tibial hair-scales.

Type ♂ (28748); ♀ (28747) Mus. Wlsm.

Hab. Hawaii: Mt. Kilauea, viii. 1896. Two specimens.

This species is readily recognised by the very strong orange-ochreous cilia which in *calva* are only slightly tinged; the ochreous thorax also distinguishes it from that species.

277. (141) *Hyposmocoma malornata*, sp. nov. (Pl. XXIII. fig. 10).

Antennae slightly serrate, dark umber-brown; the basal joint with a narrow subochreous ring around its outer extremity. Palpi dark umber-brown, with a narrow subochreous ring around the outer extremity of the median joint and a slight sprinkling of subochreous scales on the upper side of the terminal joint. Head and Thorax dark umber-brown. Forewings dark umber-brown, inclining to fuscous, very sparsely sprinkled with pale subochreous scales, a small patch of these forming a discal spot at about one-sixth from the base, obliquely diffused outward towards a smaller spot on the lower edge of the fold; a little before the apex are two opposite pale ochreous spots, on the costa and tornus respectively; cilia brownish fuscous, becoming brownish grey on their outer half and about the tornus. Exp. al. 14 mm. Hindwings leaden grey; cilia brownish grey; ♂ with a brownish fuscous subcostal hair-pencil. Abdomen brownish fuscous above, whitish ochreous beneath; the anal tuft pale ochreous. Legs dark brownish fuscous, the spurs and five tarsal annulations pale ochreous.

Type ♂ (26653) *Maui*, Mus. Wlsm.

Hab. Kauai: Kaholuamano, 4000 ft., (3) iv. 1895; Halemanu, 4000 ft., (1) v. 1895; Mts., 3000—4000 ft., (4) vi. 1894.—Molokai: above 3000—4000 ft., (18) 30. v.—13. vi. 1893; about 5000 ft., (1) 13. ix. 1893; above 3000 ft., (1) 16. ix. 1893.—Maui: Olinda (Haleakala), 4000 ft., (1) iv. 1894.—Hawaii: Olaa, (1) ix. 1896. Thirty specimens.

278. (142) *Hyposmocoma quinquemaculata*, sp. nov. (Pl. XXIII. fig. 11).

Antennae whitish cinereous, spotted above with fuscous, the basal joint fuscous above. Palpi whitish cinereous, profusely speckled on the median joint, except at its apex, and shaded on the terminal joint with fuscous. Head and face whitish cinereous. Thorax whitish cinereous, sprinkled with fuscous. Forewings whitish cinereous, sprinkled with fuscous, with five conspicuous fuscous spots; one near the base of the fold, reniform; another, also placed in the fold, beyond its middle; a third resting on the outer end of the fold; the two latter almost connected with two discal spots above them, one at the end of the cell and one a little before it; a spot at the base of the costa and a triangular costal mark at about one-third from the base are somewhat faintly indicated, followed by a whitish spot at the commencement of the costal cilia; cilia pale brownish cinereous, slightly speckled with fuscous. Exp. al. 15—16 mm. Hindwings brownish grey; cilia pale brownish cinereous; ♂ without subcostal hair-pencil. Abdomen dark greyish, anal tuft ochreous. Legs fuscous, whitish ochreous at the joints.

Type ♂ (28505); ♀ (25703) Mus. Wlsm.

HAB. HAWAII: Kona, 4000 ft., VI. 1892, 13. VIII. 1892, 8. IX. 1892. Three specimens.

Allied to *conditella* but distinguished by the absence of the hair-pencil in the hindwings.

279. (143) *Hyposmocoma conditella*, sp. nov. (Pl. XXIII. fig. 12).

Antennae greyish fuscous, the basal joint speckled with pale ochreous. Palpi olive-grey, shaded and speckled with greyish fuscous. Head greyish fuscous, inclining to ochreous at the sides. Thorax greyish fuscous, speckled with pale ochreous. Forewings greenish olivaceous, blotched and speckled with greyish fuscous throughout, with an admixture of a few pale ochreous scales; a pale ochreous costal spot before the apex, with an indistinct smaller one on the opposite margin; the darker patches are ill-defined but distributed approximately thus—one from the costa near the base, crossing the fold obliquely outward; one from the costa at one-third, reaching obliquely outward to the dorsum, but somewhat interrupted above the fold; a spot on the disc in the middle of the wing, followed by another at the end of the cell from which a diffused and dilated shade extends to the tornus; this is followed by an angular ante-apical shade arising from the extremities of the two pale marginal spots: cilia greyish, speckled with greyish fuscous. Exp. al. 15—16 mm. Hindwings brownish grey; cilia pale brownish grey; ♂ with fuscous subcostal hair-pencil. Abdomen brownish grey. Legs greyish olivaceous, with whitish tarsal spots, spurs and tibial hairs.

Type ♂ (26890) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., VI. 1894. Five specimens.

280. (144) *Hyposmocoma montivolans*, Btl. (Pl. XXIII. fig. 13).

Laverna parda? Btl. + *montivolans*, Btl., Tr. Ent. Soc. Lond. 1882, 44, No. 17 (1882)[1].

Antennae delicately banded with greyish fuscous and pale ochreous; basal joint greyish fuscous. Palpi reaching more than the length of the head beyond and above it; median joint somewhat stout, smooth; apical joint as long as the median but more slender, smooth; pale olive-green, speckled with greyish fuscous. Head and Thorax olive-green, sprinkled with greyish fuscous. Forewings olive-green, sprinkled with greyish fuscous ; a dark greyish costal shade beyond the middle is followed by a few rather ochreous scales at the commencement of the costal cilia; a narrow greyish fuscous terminal shade extends around the apex where it is followed by some ochreous scales at the base of the apical cilia ; a series of three brownish fuscous spots is situated on the cell, the outer one at the end of the cell being larger than the other two and about as far distant from the apex as the inner one is from the base ; nearer to the base is another spot of the same colour on the fold, diffused obliquely outward across it ; a larger spot lies about the middle of the fold, diffused obliquely outward to the dorsum, and a third is at the end of the fold near the tornus; cilia greenish cinereous, sprinkled with greyish fuscous, inclining to ochreous about the tornus. Exp. al. 14 mm. Hindwings with a large expansible dark blue-grey subcostal hair-pencil ; cilia grey, with a brownish tinge. Abdomen brownish grey, with a green iridescence. Hind Legs (missing).

Type ♂ (162 : 81. 9) Mus. Br. [Caenotype ♂ (25142) Mus. Wlsm.]

HAB. OAHU : Mts., near Honolulu (Blackburn)[1]; Waianae Mts., "cases on rocks, lichenivorous, excl. IV. 1892" one specimen (Perkins).

The larva feeds on lichens on rocks, living in a silk-lined accumulation of frass, slightly pointed toward its anal extremity, the opening at the anterior end being large and straight.

281. (145) *Hyposmocoma iodes*, sp. nov. (Pl. XXIII. fig. 14).

Antennae dusky cinereous, the basal joint darkened. Palpi fuscous, the apex of the median joint whitish ; terminal joint whitish, sprinkled with fuscous. Head and Thorax dusky cinereous. Forewings dull whitish cinereous, profusely sprinkled and somewhat clouded with brownish grey ; with obscure rusty brownish markings consisting of an outwardly oblique basal patch, angulated to the dorsum below the fold, a slight subcostal cloud-spot at one-third, followed at equal distances by two discal spots, the outer one at the end of the cell ; below and before the first is a small patch on the fold, diffused downward to the dorsum, and below and beyond the second is a tornal patch at the end of the fold ; the usual ante-apical band is very indistinct ; cilia pale brownish cinereous. Exp. al. 13—14 mm. Hindwings and cilia brownish cinereous. Abdomen greyish fuscous above, whitish cinereous beneath. Legs whitish cinereous, tarsi faintly banded above.

Type ♂ (26321) ; ♀ (26144) Mus. Wlsm.

HAB. MOLOKAI : above 3000 ft., (3) 16. IX. 1893, (1) 5. VI. 1893 ; above 4000 ft., VI. 1893. Five specimens.

The species is nearly allied to *liturata*, but is distinguished by its duller ground-colour and somewhat more ferruginous markings, the position of the spots however, is about the same in both species and it is possibly only a geographical variation.

282. (146) *Hyposmocoma liturata*, sp. nov. (Pl. XXIII. fig. 15).

Antennae brownish fuscous. Palpi whitish ochreous, profusely sprinkled with fuscous. Head and Thorax brownish fuscous, sprinkled with pale ochreous, a band of the latter crossing the thorax posteriorly. Forewings, the ground-colour consists of an almost equal admixture of fuscous and whitish ochreous scales on which five dark fuscous spots are distinguishable; three discal, one at about one-third, one a little beyond the middle and one at the end of the cell; one plical, between the first and second discal; and one tornal, beyond the outer discal, this latter is bounded on either side by whitish ochreous scales, a conspicuous spot of the same being placed opposite to its outer margin; cilia brownish grey, minutely speckled with fuscous and whitish ochreous along their base. Exp. al. 10—12 mm. Hindwings leaden grey; cilia brownish grey; ♂ with a dark mouse-grey costal hair-pencil at the base. Abdomen leaden grey, anal tuft inclining to ochreous. Hind Legs greyish ochreous, the tarsi speckled with fuscous.

Type ♂ (25410) *Hawaii*, Mus. Wlsm.

HAB. MOLOKAI: above 4000 ft., (2) VI. 1893.—HAWAII: Kona, 4000 ft., (1) VII., (12) VIII.—IX. 1892; Olaa, (1) VII. 1895. Sixteen specimens.

The colour of the head and thorax appears to be variable, those varieties in which they are both quite pale reminding one of small specimens of *Endrosis lacteella*, Schiff.

The Molokai specimens, which are slightly paler, can only be regarded as varieties of this species.

283. (147) *Hyposmocoma mimica*, sp. nov. (Pl. XXIII. fig. 16).

Antennae whitish cinereous, barred with brown above. Palpi whitish cinereous, sprinkled with brownish fuscous externally. Head ochreous, more or less sprinkled with brownish fuscous (sometimes suffused). Thorax brownish fuscous; tegulae whitish cinereous (sometimes almost ochreous). Forewings whitish cinereous, sprinkled with brownish; a brownish basal patch, angulated outward on the fold; a brownish costal patch before the middle, diffused downward on to the cell; another diffused costal patch beyond the middle and much suffusion of brownish scaling along the dorsum about the tornus, and at the apex, leaving the pale ground-colour more conspicuous only in an oblique band near the base, a patch about the middle, and two opposite marginal spots before the apex; there is a large brownish fuscous spot about the middle of the fold, another above and beyond it on the cell, a third at the end of the cell, and a fourth indicated at the outer angle of the basal patch below the fold; cilia whitish cinereous, blending to brownish grey about the tornus. Exp. al. 9—11 mm. Hindwings purplish grey; cilia brownish grey; ♂ without subcostal hair-pencil. Abdomen brownish grey. Legs brownish grey, the tarsi annulate with whitish.

Type ♂ (26224); ♀ (26155) Mus. Wlsm.

HAB. MOLOKAI: above 3000 ft., 30. V.—24. VI. 1893; 6—16. IX. 1893. Twenty-one specimens.

In some specimens the whitish ground-colour is almost completely suffused with brownish fuscous, the same general pattern of markings being traceable, but the cilia are also streaked and shaded with the darker colour. It approaches so nearly in appearance to *Hyposmocoma liturata*, in a parallel series of variations, that the separation of the species would be almost impossible without the character found only in the males.

284. (148) *Hyposmocoma parda*, Btl. (Pl. XXIII. fig. 17).

Laverna parda Btl., Ann. & Mag. NH. (5. s.) VII. 406, No. 49 (1881)[1].

Antennae pale cinereous, annulate with dark fuscous; the basal joint blackish. Palpi dirty whitish, speckled and shaded with brownish black. Head dull ochreous, with dark grey speckling. Thorax fuscous, with some whitish ochreous specks. Forewings whitish, slightly olivaceous, much clouded and speckled with brownish black, leaving a pale costal spot at four-fifths, and a few specks on the termen at the base of the greyish cilia which have a darker shade on their basal half; two large blackish discal spots are preceded by a plical spot beneath them, and are more or less thrown into prominence by the pale ground-colour around them, which is only sparsely discernible on the remainder of the wing. Exp. al. 12—13 mm. Hindwings leaden grey; cilia brownish grey; ♂ without subcostal hair-pencil. Abdomen dark fuscous. Legs dirty whitish, shaded with dark fuscous externally, and spotted on the tarsi with the same.

Type ♀ (125 : 81. 7) Mus. Br. [Caenotype ♂ (28478) *Maui*, Mus. Wlsm.]

HAB. MAUI: Haleakala, 4000 ft., "apparently connected with dead wood" (Blackburn)[1]; Olinda (Haleakala), 4000 ft., IV. 1894, V. 1896 (Perkins); Haleakala, 4000—5000 ft., V. 1896 (Perkins); [? Makawao (Blackburn)[1]].—HAWAII: Kona, 4000 ft. to above 4000 ft., VI.—VIII. 1892, 2500 ft., IX. 1892 (Perkins); Hualalai (Kona), 5000 ft., 5. VIII. 1892 (Perkins). Twenty-eight specimens.

Three specimens in the series (*Hualalai*, 25836—8) are probably mere varieties; these tend to exhibit more of the whitish ground-colour, especially along the middle of the wing, the discal spots being partially obliterated; the palpi also are whiter.

285. (149) *Hyposmocoma lixiviella*, sp. nov. (Pl. XXIII. fig. 18).

Antennae whitish ochreous, banded with dark brownish fuscous; basal joint dark brownish fuscous. Palpi whitish ochreous, the median joint shaded externally and the terminal joint shaded beneath with dark brownish fuscous. Head greyish fuscous; face whitish ochreous. Thorax greyish fuscous, tegulae whitish ochreous, shaded at the base. Forewings whitish ochreous, profusely sprinkled with brownish fuscous and darker fuscous scales; an elongate fuscous spot at the base of the costa is followed by a small discal spot below its outer extremity; a large discal spot beyond the middle is preceded by one of equal size on the fold below it; some fuscous shading on the costa, at about two-thirds from the base, is diffused downwards and almost connected with a similar fuscous shade about the tornus, and beyond it is an outwardly angulated band of the pale ground-colour followed by a broken fuscous shade around the apex and termen; cilia whitish ochreous, with a brownish fuscous band along their base. Exp. al. 10—11 mm. Hindwings and cilia greyish brown; ♂ with a slight blackish subcostal hair-pencil. Abdomen fuscous. Legs whitish ochreous, shaded on the tibiae and banded on the tarsi externally with greyish fuscous.

Type ♀ (27293); ♂ (27027) Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., (2) v. 1894, (14) vi. 1894; Halemanu, 4000 ft., (1) v. 1895. Seventeen specimens.

Hyposmocoma, sp.

Hab. Oahu: Waianae Mts., 2000 ft., iv. 1892.

Four specimens in poor condition (25128–31) differ in the colour of the palpi and probably represent a closely allied species; but such material would not justify description.

286. (150) *Hyposmocoma saliaris*, sp. nov. (Pl. XXIII. fig. 19).

Antennae fuscous, with faint pale annulations. Palpi white, speckled with fuscous. Head hoary. Thorax dark fuscous, tegulae whitish. Forewings dark fuscous, or brownish black, with a dirty white streak along the dorsum having two angulated excrescences projecting into the dark ground-colour above it, this dorsal streak is not usually continued to the base; the costa shows some white speckling, especially in a costal spot at four-fifths; cilia blackish, with three or four whitish spots at their base, tornal cilia brownish grey. Exp. al. 10—11 mm. Hindwings and cilia brownish grey; ♂ without subcostal hair-pencil. Legs dirty whitish; hind tibiae with pale brownish grey hairs, tarsi fuscous spotted with white.

Type ♀ (25507); ♂ (25516) Mus. Wlsm.

Hab. Hawaii: Kona, 4000 ft., (1) vi. 1892, (3) 4. vii. 1892, (3) 12—17. viii. 1892; Mt. Kilauea, (1) vii. 1895. Eight specimens.

This species differs from *parda* in the development of a pale dorsal streak and in the obliteration of the discal and plical spots.

287. (151) *Hyposmocoma phalacra*, sp. nov. (Pl. XXIII. fig. 20).

Antennae tawny fuscous. Palpi, median joint tawny fuscous, with a cream-white spot at its apex; terminal joint entirely cream-white. Head cream colour. Thorax tawny fuscous. Forewings tawny fuscous, with a cream-white dorsal streak commencing near the base where it occupies the whole space beneath the fold, gradually attenuated to its termination at the tornus where it is somewhat tinged with ochreous, the tornal cilia corresponding in colour, the terminal cilia being tawny fuscous; a whitish spot on the middle of the costa is succeeded by a second spot, at the commencement of the costal cilia, which, like the extremity of the tornal streak, a little beyond it on the opposite margin, is tinged with ochreous. Exp. al. 9—10 mm. Hindwings grey; cilia brownish grey; ♂ with expansible blackish subcostal hair-pencil. Abdomen brownish. Legs tawny grey, spurs and tarsal spots cream-white.

Type ♀ (27252); ♂ (27033) Mus. Wlsm.

Hab. Kauai: Halemanu, 4000 ft., (1) v. 1895; Mts., 3000—4000 ft., (4) vi. 1894. Five specimens.

288. (152) *Hyposmocoma pseudolita*, sp. nov. (Pl. XXIII. fig. 21).

Antennae tawny fuscous, a pale ochreous ring around the apex of the basal joint. Palpi tawny fuscous, whitish ochreous on their inner sides, a pale ochreous ring around the apex of the median joint. Head dusky cinereous. Thorax tawny fuscous, with two pale ochreous spots behind the middle. Forewings ochreous, thickly sprinkled and shaded with tawny fuscous which more or less obscures all the supraplical area, with the exception of two ochreous costal patches, one about the middle the other at the commencement of the costal cilia; opposite to the latter is an ochreous tornal spot; the dark tawny fuscous scales are concentrated in an ill-defined short basal patch, sharply angulated on the fold, in a plical spot beyond the middle, with a large discal spot above and a little beyond it, and in a smaller spot at the end of the cell; cilia profusely sprinkled with tawny fuscous, an ochreous streak running through them from the tornal spot. Exp. al. 8—9 mm. Hindwings pale grey; cilia pale brownish ochreous; ♂ with expansible blackish subcostal hair-pencil. Abdomen tawny fuscous. Legs pale ochreous, the tibiae shaded and the tarsi banded with tawny fuscous.

Type ♂ (26020) *Oahu*, Mus. Wlsm.

Hab. Oahu: Waianae Mts., (2) iv. 1892.—Molokai: above 3000 ft., (1) 30. v. 1893.—Hawaii: Kona, 2000 ft., (1) ix. 1892. Four specimens.

289. (153) *Hyposmocoma irregularis*, sp. nov. (Pl. XXIII. fig. 22).

Antennae annulate with dark brown and pale ochreous; the basal joint dark brown above, except at its extreme apex. Palpi dark brownish, a pale ochreous ring at the outer end of the median joint and a few pale ochreous scales about the middle of the terminal joint. Head, face, and tegulae pale ochreous, the middle of the Thorax mixed with brownish grey. Forewings pale ochreous, scaled and clouded with dark brownish fuscous, of which a broad triangular costal shade, broken a little beyond its middle, reaches a little below the fold; another broad shade occupies the apical portion of the wing, overflowing the costal but not the terminal cilia; the pale space between these shades is broken by a large roundish spot at the end of the cell; at the base of the fold is another conspicuous dark brownish fuscous spot, expanding outward, but not crossing the pale ochreous band which separates the central shade from an oblique ill-defined basal patch; cilia pale ochreous, with a few dark scales along their middle. Exp. al. 15 mm. Hindwings rather pale greyish; cilia and subcostal hair-pencil greyish ochreous. Abdomen greyish ochreous. Legs brownish fuscous, with pale ochreous tarsal spots and hind tibial hairs.

Type ♂ (27037) Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., vi. 1894. Unique.

290. (154) *Hyposmocoma fervida*, sp. nov. (Pl. XXIII. fig. 23).

Antennae whitish, annulate with fuscous. Palpi fuscous, sprinkled with whitish, a whitish ochreous ring around the apex of the median joint. Head whitish. Thorax ochreous, with a greyish shade anteriorly. Forewings yellowish white, with a short black basal patch, its anterior half sprinkled with whitish ochreous, its outer edge slightly oblique, clearly defined; a dark tawny fuscous V-shaped patch, terminating about the middle, crosses the fold at its lower angle, but does not reach the dorsum; above the tornus is a smaller reniform patch of the same colour, the space between these, and above and beyond them to the costa and apex, being thickly bestrewn with greyish fuscous, leaving a clear whitish ochreous costal spot about the commencement of the cilia; costal cilia greyish fuscous, terminal and tornal cilia ochreous, sparsely speckled with fuscous. Exp. al. 12—13 mm. Hindwings and cilia pale brownish grey. Abdomen brownish grey. Legs whitish ochreous, with four fuscous tarsal bands above, diminishing in width outward.

Type ♀ (26204) Mus. Wlsm.

Hab. Molokai: Above 3000 ft., 5. vi. 1893. Three specimens.

291. (155) *Hyposmocoma torella*, sp. nov. (Pl. XXIII. fig. 24).

Antennae whitish ochreous, barred above with black. Palpi whitish ochreous, marked on the outer side with a patch of blackish scales on the middle of the median joint, and a spot at the terminal joint, with a blackish ring before its apex. Head pale ferruginous. Thorax brown. Forewings whitish ochreous, mixed with pale ferruginous, with three dark brown blotches in which is some admixture of blackish scales; a short straight pale ferruginous basal patch has some brown scales along the costa and on its outer edge, and a large mixed tuft of raised scales below the fold; it is succeeded by an oblique trapezoidal costal blotch before the middle, reaching a little over the fold, with a few raised scales at its outer extremity; a postmedian costal patch of the same colour, not reaching the tornus, is connected at its lower extremity with a smaller apical patch around which the ferruginous tinge extends over the cilia, except at the extreme apex. Exp. al. 12 mm. Hindwings leaden grey; cilia pale brownish grey; subcostal hair-pencil leaden grey. Abdomen dark leaden grey. Legs fuscous, the ends of the tibiae and tarsi banded with white.

Type ♂ (26058) Mus. Wlsm.

HAB. MOLOKAI: 12. VI. 1893. Unique.

292. (156) *Hyposmocoma arenella*, sp. nov. (Pl. XXIII. fig. 25).

Antennae pale ochreous, faintly banded above with fuscous; the basal joint blackish. Palpi pale ochreous, blackish along the outer side of the median joint nearly to its apex, a blackish spot below the extremity of the shorter terminal joint. Head pale ochreous. Thorax pale ochreous, shaded with fuscous. Forewings very pale ochreous, with three blackish costal spots, one small at the base, one large before the middle, and one smaller beyond the middle; two plical spots, one small near the base of the fold, the other large beyond the middle of the fold, and two discal spots, one at the end of the cell and one on the middle of the wing; these are all fairly distinct, but between and beyond them some scattered blackish scales lead up to a series of confluent blackish marginal spots, running around the apex and termen before the pale ochreous cilia, which are slightly shaded with fuscous. Exp. al. 14—16 mm. Hindwings elongate ovate, as wide as the forewings; greyish brown; cilia scarcely paler; ♂ without subcostal hair-pencil. Abdomen greyish brown. Legs whitish ochreous.

Type ♂ (25758); ♀ (25380) Mus. Wlsm.

HAB. HAWAII: Kona, 2000—5000 ft., VI.—VII. 1892, IX. 1892; Hualalai (Kona), 5000 ft., 5. VIII. 1892; Olaa, VI.—VII. 1895, IX. 1896, XI. 1896; Hilo, 2000 ft., I. 1896. Thirty-eight specimens.

In some varieties of the ♀ the costa and dorsum are shaded with dark tawny brown, the disc remaining pale and presenting a streaky appearance.

293. (157) *Hyposmocoma nebulifera*, sp. nov. (Pl. XXIII. fig. 26).

Antennae pale ochreous, distinctly banded above with dark brown. Palpi pale ochreous, the median joint shaded externally with dark brown nearly to its apex, the terminal joint shaded beneath its apex. Head and Thorax pale ochreous. Forewings pale ochreous, with a small dark brown spot at the base of the costa followed by two smaller ones on either side of the fold near the base; an oblique, ill-defined, dark brown costal shade, at about one-third from the base, tends slightly outward to the fold, where it terminates in a dark brownish fuscous spot, above and slightly beyond which is a similar spot on the cell also adjacent to the brown shade; a third spot lies at the end of the cell and the pale ground-colour above and beyond it, as well as somewhat below the fold, is bestrewed with brown scales, a series of confluent dentate spots occurring at the base of the pale ochreous costal and terminal cilia. Exp. al. 16—17 mm. Hindwings shining, pale straw-ochreous, with dull pale ochreous cilia; ♂ without subcostal hair-pencil. Abdomen and Legs pale ochreous; hind tibiae almost smooth.

Type ♀ (25134); ♂ (25136) *Oahu*, Mus. Wlsm.

HAB. OAHU: Waianae Mts., 3000 ft., (4) IV. 1892 "beaten from dead boughs."—MAUI: Olinda (Haleakala), 4000 ft., (1) V. 1896. Five specimens.

Closely allied to *arenella* but differing in its paler hindwings and larger size.

294. (158) *Hyposmocoma rubescens*, sp. nov. (Pl. XXIII. fig. 27).

Antennae reddish fawn, faintly barred with tawny brown; basal joint tawny brown above. Palpi pale reddish fawn, the median joint dark tawny brown externally nearly to its apex, the terminal joint tipped with tawny brown. Head and Thorax pale reddish fawn, somewhat shaded with tawny brown. Forewings pale reddish fawn, blotched and spotted with dark tawny brown, which appears in a short basal patch, a costal shade at one-third from the base, attenuated on the cell, dilated to a dark spot on the fold, and thence diffused to the dorsum in an outwardly oblique course; a median spot on the cell is followed by another at its outer extremity, above which is a small costal shade; there is also an oblique subterminal shade, nearly parallel with a series of confluent terminal spots, which revert along the costa at the base of the cilia; cilia pale reddish fawn, slightly sprinkled with dark brown toward the apex. Exp. al. 14—18 mm. Hindwings pale leaden grey; cilia brownish grey; ♂ without subcostal hair-pencil. Abdomen brownish ochreous. Legs very pale ochreous.

Type ♀ (27238); ♂ (26996) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895; Mts., 3000—4000 ft., V.—VI. 1894.—MAUI: Olinda (Haleakala), 4000 ft., (3) IV. 1894. Nineteen specimens.

The three females from Maui belong apparently to the same species.

295. (159) *Hyposmocoma scolopax*, sp. nov. (Pl. XXIII. fig. 28).

Antennae pale ochreous, banded with dark brown; basal joint dark brown, pale ochreous at its apex. Palpi pale ochreous, median joint externally with a dark brown band at its base and another at two-thirds of its length; terminal joint with a blackish ring at its base and a second before its apex. Head and Thorax fuscous, mixed with ochreous. Forewings pale ochreous, mottled with dark tawny brown; an angulated brown basal patch, followed by a half-fascia of the same colour before the middle, terminating slightly below the fold; a dark spot at the cell and another at the end of the cell forming part of a second half-fascia, dilated upward to the costa, almost confluent, at its lower extremity, with an apical shade extending downward to the tornus, with three or four extensions into the base of the pale ochreous cilia which are traversed by two fuscous lines. Exp. al. 13—14 mm. Hindwings and cilia brownish grey; ♂ with expansible fuscous hair-pencil. Abdomen leaden grey; ♀ ochreous towards the base. Legs whitish ochreous, with tawny brown bands across the tibiae and tarsi.

Type ♂ (26824); ♀ (26866) *Kauai*, Mus. Wlsm.

HAB. KAUAI: 3000—4000 ft., (12) V.—VI. 1894.—MOLOKAI: sea-level, (1) V. 1893, (1) 12. VI. 1893. Fourteen specimens.

296. (160) *Hyposmocoma subscolopax*, sp. nov. (Pl. XXIV. fig. 1).

Antennae fuscous, with faint pale annulations. Palpi whitish ochreous, with two fuscous bands around the median and two around the terminal joint. Head pale ochreous, sometimes speckled with fuscous. Thorax fuscous. Forewings brownish fuscous, mixed with rust-brown, crossed by whitish bands speckled with brown; the first narrow, at one-fifth from the base, encloses a short basal patch, its outer edge slightly curved outward on the fold; this white band, although much suffused with the dark ground-colour, is traceable along the dorsum connecting it with a broader band, scarcely beyond the middle, which is dilated outward nearly to the end of the fold and contains at its inner edge a more or less distinct discal spot; before the apex is a strong white costal spot, with a few whitish scales on the opposite margin; a few raised scales near the dorsum on the basal patch and before the tornus; cilia whitish ochreous, varying to whitish, mottled along their basal half. Exp. al. 11—14 mm. Hindwings and cilia pale brownish grey; ♂ with subcostal hair-pencil. Abdomen brownish grey. Legs greyish, with pale fuscous annulations.

Type ♂ (27382); ♀ (27463) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VI.—VIII. 1895; Kona, 3000—5000 ft., 4. VII.—IX. 1892. Ten specimens.

In some varieties the white bands are more conspicuous, being less suffused or sprinkled. In one variety (28112) the white is distinctly suffused with rust-brown along the dorsum, the basal patch being also strongly tinged with the same colour.

This species differs from *scolopax* in the much more conspicuous white costal spot and in the clearer definition of the pattern, also in the form of the outer pale fascia, which in this species tends to encroach, above the middle, on the dark space preceding it. It differs from *tetraonella* in the possession of a subcostal hair-pencil.

297. (161) *Hyposmocoma tetraonella*, sp. nov. (Pl. XXIV. fig. 2).

Antennae brownish fuscous, with distinct white annulations, the basal joint brownish fuscous nearly to its apex. Palpi white, with two fuscous spots externally on the median joint and two fuscous annulations on the terminal joint. Head white, or whitish ochreous, sometimes with a brown suffusion. Thorax brownish fuscous. Forewings brown, with fuscous speckling, and white, or whitish, ill-defined transverse bands; the first at one-fifth, enclosing a basal patch, dilated outward along the dorsum and more or less connected with a median band which encloses the first discal spot; some white scales occur also around the outer discal spot; a white spot on the costa before the apex tends obliquely outward, some whitish scales also about the tornus and termen and in the base of the mottled cilia; a plical spot very slightly precedes the first discal, but these are sometimes almost lost in the general suffusion of the dark ground-colour. Exp. al. 11—12 mm. Hindwings dark tawny fuscous (sometimes paler in the ♀); cilia scarcely paler; ♂ without subcostal hair-pencil. Abdomen dark tawny fuscous. Legs greyish, hind tarsi very distinctly annulate with white and tawny fuscous.

Type ♂ (25748); ♀ (25428) Mus. Wlsm.

HAB. HAWAII: Kona, 3000—above 4000 ft., 24. VI.—10. VII., VIII., IX. 1892; Mt. Kilauea, VII. 1895. Twelve specimens.

It would be extremely difficult to justify the separation of this species from *subscolopax* but for the absence of the subcostal hair-pencil, it is however if anything slightly smaller, more mottled and with darker hindwings.

298. (162) *Hyposmocoma somatodes*, sp. nov. (Pl. XXIV. fig. 3).

Antennae fuscous, faintly annulate with pale greenish ochreous. Palpi ochreous, with olivaceous fuscous bands on the median and terminal joints. Head and Thorax olivaceous fuscous, with some admixture of ochreous scales. Forewings whitish ochreous, much sprinkled and suffused with olivaceous fuscous, the discal and plical spots together with the apex dark fuscous; the first discal is reniform, obliquely placed, encircled by the plain ground-colour; the second, at the end of the cell, internally pale-margined is rounder; the plical, also elongate, and produced downward at its apex; a basal patch is faintly indicated and the dark shading does not obliterate a somewhat angular pale band from the costal cilia, attenuated downward to the tornus; cilia mottled on their basal half with dark fuscous and pale ochreous, outwardly pale greyish ochreous. Exp. al. 14 mm. Hindwings and cilia pale brownish grey; ♂ without subcostal hair-pencil. Abdomen brownish grey. Legs whitish ochreous, with fuscous bands.

Type ♂ (27490); ♀ (25307) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VII. 1895; Kona, 4000 ft., IX. 1892. Two specimens.

A rather sturdy, distinct-looking species, with somewhat obtuse palpi and very distinctly hairy legs.

299. (163) *Hyposmocoma belophora*, sp. nov. (Pl. XXIV. fig. 4).

Antennae brown, with pale ochreous annulations. Palpi pale ochreous, mottled with brown externally to beyond the middle of the median joint, with a brown ring before its apex; terminal joint much mottled with brown externally. Head and Thorax olive-brown, mixed with pale ochreous. Forewings olive-brown, sprinkled with pale ochreous scales; some whitish sinuous marks, before and about the middle, indistinctly define a dark plical spot succeeded by a discal spot above it, with a faint trace of a third in the darker brown at the end of the cell; this is succeeded by a white arrow-head mark, outwardly curved from the costa at two-thirds nearly to the apex, its lower and narrower barb reverting to the tornus; in the costal and terminal cilia are whitish spots alternating with olive-brown streaks. Exp. al. 15 mm. Hindwings very pale brownish grey; cilia brownish grey; ♂ without subcostal hair-pencil. Abdomen greyish. Legs pale cinereous, mottled and banded with brown.

Type ♂ (25652) Mus. Wlsm.

HAB. OAHU: Near head of Kawailoa Gulch, IV. 1893. Unique.

300. (164) *Hyposmocoma turdella*, sp. nov. (Pl. XXIV. fig. 5).

Antennae fuscous, very faintly annulate. Palpi brownish ochreous, banded with fuscous externally in two bands on each of the median and terminal joints. Head and Thorax rust-brown. Forewings rust-brown, sprinkled and shaded with fuscous and obscurely banded with ochreous; the darker shading narrowly limits a short rust-brown basal patch, its outer edge curved and crenulate, it is somewhat concentrated in two patches, on either side of the middle of the costa, which are diffused downward across the wing, but do not obliterate the rather pale-margined dark discal and plical spots; the apex of the wing is also clouded with fuscous and a line of the same runs through the ochreous cilia. Exp. al. 11—12 mm. Hindwings and cilia dark tawny fuscous; ♂ without subcostal hair-pencil. Abdomen greyish fuscous. Legs greyish fuscous, with pale ochreous spurs and tarsal bands.

Type ♀ (28676); ♂ (26510) Mus. Wlsm.

HAB. LANAI: 2000 ft., (3) VII. 1894, (1) XII. 1893. Four specimens.

Differs from *tetraonis* in the somewhat more acute and slender palpi, of which the terminal joint is somewhat longer than the median.

301. (165) *Hyposmocoma subcitrella*, sp. nov. (Pl. XXIV. fig. 6).

Antennae whitish ochreous, spotted above with fuscous. Palpi pale ochreous, annulate with fuscous, narrowly beyond the middle of the median joint; narrowly at the base, and widely before the apex, of the terminal joint. Head pale ochreous. Thorax orange-ochreous, speckled with fuscous. Forewings pale ochreous, mixed with orange-ochreous below the fold and near the lower angle of the cell, and profusely sprinkled with brownish fuscous, forming groups of scaling, crossing the wing obliquely outward at one-third, overspreading the dorsum; more thickly concentrated in a costal patch at two-thirds, which extends obliquely outwards beyond the end of the cell, and in a broken apical patch; there is a blackish patch at the base of the dorsum and another at the end of the cell; cilia ochreous, mottled at their base with brownish fuscous, a slender shade-line running through them beyond their middle. Exp. al. 10 mm. Hindwings and cilia pale grey; subcostal tuft in the ♂ grey. Abdomen yellowish grey. Legs greyish, tarsi alternately dark grey and whitish.

Type ♀ (27620); ♂ (27622) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., larva (lichenivorous?) on *Cheirodendron*, *Metrosideros*, etc., IV., excl. IV.—V. 1895. Three specimens.

The larval case, which is coated with frass, is streaked with black, especially along its lower edge; it bulges in the middle and is attenuate to either end, the ends obtuse.

302. (166) *Hyposmocoma inflexa*, sp. nov. (Pl. XXIV. fig. 7).

Antennae whitish ochreous, barred above with brown; basal joint brown nearly to its apex. Palpi whitish ochreous, mottled with fuscous externally near the base, and before the apex of each joint. Head whitish ochreous; face white. Thorax whitish, mixed with ferruginous. Forewings whitish, smeared with pale ferruginous before the middle, along the cell, and about the apex; with a short ferruginous and fuscous basal patch, a small fuscous antemedian subcostal spot and an inverted oblique fuscous fascia, from the costa at two-thirds to about the middle of the dorsum, broken on the cell; apical cilia pale ferruginous, tornal cilia pale brownish grey. Exp. al. 10 mm. Hindwings pale grey; cilia pale brownish grey; ♂ without subcostal hair-pencil. Abdomen greyish fuscous. Legs pale cinereous, mottled with greyish fuscous.

Type ♂ (28264) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., V. 1896. Unique.

303. (167) *Hyposmocoma brevistrigata*, sp. nov. (Pl. XXIV. fig. 8).

Antennae pale fawn-brown, basal joint darkened above. Palpi whitish, a fuscous spot externally before the end of the median joint, a narrow band at the base and a wide band before the apex of the terminal joint. Head and Thorax fawn-brownish above; face brownish white. Forewings pale fawn-brownish, sprinkled and mottled with whitish ochreous, and some fuscous scales—these specially exhibited in a small elongate spot at the base of the costa, in two short length-streaks on the cell (one before, the other beyond the middle of the wing) and in two similar streaks in the fold (one near the base the other before the tornus), about the tornus is a similar streak lying on the dorsum; these streaks are all dark fuscous, which colour is also somewhat condensed in the position of a basal patch and on the costa before and behind the middle; a slender, pale, outwardly angulate, transverse line precedes the terminal area, a similar slender line being scarcely traceable at the base of the fawn-brownish cilia which become brownish grey on the dorsum. Exp. al. 12—13 mm. Hindwings and cilia pale brownish grey; ♂ without subcostal hair-pencil. Abdomen and Legs brownish grey; hind tarsi faintly spotted.

Type ♂ (26842); ♀ (27203) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (1) V., (7) VI. 1894. Eight specimens.

304. (168) *Hyposmocoma discolor*, sp. nov. (Pl. XXIV. fig. 9).

Antennae tawny fuscous, with dark fuscous annulations. Palpi, median joint slightly clothed, white, a tawny brown annulus before its apex; terminal joint white, mottled with tawny brown. Head mixed white and tawny brown; face white. Thorax mixed white, tawny reddish brown and black. Forewings mixed with almost equal parts of white, tawny reddish brown, and black scaling; a basal patch of the darker combination sends out a rectangle on the fold, in the space beyond it white predominates, and this is followed by two groups of scattered black scaling, on the costa and dorsum before the middle, a similar group appearing before the tornus; from the middle of the wing runs a narrow streak of black scales nearly to the apex, passing first through the tawny reddish brown, and secondly through the same mixed with white; at the apex is a whitish spot, with some whitish scales on the margin, above and below it, alternating with black; cilia tawny reddish brown, on the dorsum tawny grey. Exp. al. 11 mm. Hindwings speckled with tawny fuscous on a paler ground; cilia dark tawny grey. Abdomen tawny brown. Legs fuscous, with whitish tarsal spots.

Type ♀ (27397) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VII. 1895. Unique.

A very distinct species, not to be confused with any other.

305. (169) *Hyposmocoma fuscotogata*, sp. nov. (Pl. XXIV. fig. 10).

Antennae fuscous, delicately annulate with white; basal joint reddish ferruginous. Palpi reddish ferruginous, mottled with white, a fuscous shade before the apex of each joint externally. Head whitish ochreous. Thorax reddish ferruginous, mottled with whitish ochreous. Forewings bright reddish ferruginous, sprinkled with fuscous scales and mottled with whitish ochreous, which is specially noticeable in an incomplete fascia at one-fifth from the base, tending slightly outward from the costa to the fold; in a cuneiform spot at the commencement of the costal cilia, and narrowly around the margins of two fuscous discal spots, the first about the middle of the wing, the second at the end of the cell; cilia greyish ochreous, mottled on their basal half with ferruginous and fuscous, with a slender dark dividing line before their outer extremities. Exp. al. 13 mm. Hindwings dark fuscous; cilia tawny fuscous. Abdomen dark fuscous above, white beneath. Legs dark fuscous, the spurs and ends of the tibiae whitish, with four white tarsal annulations.

Type ♀ (26062) Mus. Wlsm.

Hab. Molokai: Above 3000 ft., 30. v. 1893. Unique.

306. (170) *Hyposmocoma radiatella*, sp. nov. (Pl. XXIV. fig. 11).

Antennae very pale fawn-ochreous. Palpi fawn-whitish. Head pale fawn-brownish above; face fawn-whitish. Thorax pale fawn-brown, the ends of the tegulae whitish. Forewings pale fawn-brownish, the course of the veins indicated by fawn-whitish lines, some of which are blended in a streak to the apex; a small darker brown discal spot is faintly shown a little before the middle, preceded by a plical spot below it and followed by a larger one at the end of the cell; a fourth, a little above the fold, follows the first discal forming with this and the plical an equilateral triangle (probably not noticeable in slightly worn specimens); a few brownish spots lie along the costa and termen at the base of the pale fawn-ochreous cilia through which runs a brownish apical streak. Exp. al. 16—20 mm. Hindwings pale, shining, brownish grey; cilia pale fawn-ochreous; ♂ without subcostal hair-pencil. Abdomen and Legs pale fawn-ochreous.

Type ♀ (25260); ♂ (25768) *Hawaii*, Mus. Wlsm.

Hab. Kauai: Kaholuamano, 4000 ft., (9) iv. 1895; Mts., 3000—4000 ft., (4) v.—vi. 1894.—Oahu: Waianae Mts., about 3000 ft., (1) iv. 1892.—Molokai: about 4000 ft., (2) 22. v.—9. vi. 1893.—Hawaii: Kona, 4000 ft., (5) 13. viii.—8. ix. 1892, 3000 ft., (1) x. 1892; Hilo, 2000 ft., (3) xii. 1895. Twenty-five specimens.

In some specimens the predominant tint is fawn-whitish and the lines between the veins on the forewings are indicated in a rather darker shade of brown, the discal cell being entirely pale; in these the four spots are more pronounced and also of a rather darker shade. I am unable to regard them as distinct.

307. (171) *Hyposmocoma barbata*, sp. nov. (Pl. XXIV. fig. 12).

Antennae pale fawn-ochreous, the basal joint brownish in front. Palpi fawn-white; the median joint clothed with long scales projecting beneath it, with two oblique brownish bars, one near the base the other near the apex; the terminal joint with two slender longitudinal lines beneath. Head and Thorax pale fawn-ochreous, shaded with brownish fuscous; face paler. Forewings pale fawn-ochreous, sprinkled longitudinally with brownish fuscous, the dorsum clouded with the same throughout, except at the extreme base; the usual discal spots are indicated, and there are two plical spots, one before, the other beyond the first discal; a short fuscous basal streak between the fold and the costa; cilia pale fawn-ochreous, shaded with brownish fuscous at and beneath the apex. Exp. al. 15 mm. Hindwings shining brownish grey; cilia with a slight ochreous tinge. Abdomen fawn-grey. Legs pale fawn-ochreous.

Type ♀ (26219) Mus. Wlsm.

HAB. MOLOKAI: above 3000 ft., 5. VI. 1893. Unique.

Somewhat resembling *radiatella*, but differing in the dorsal shade, in the absence of the distinct vein-marks and in the hairy palpi, in which it agrees with *Aphthonetus*, but vein 6 is separate in the forewings and 6 and 7 of the hindwings are not stalked.

308. (172) *Hyposmocoma fractistriata*, sp. nov. (Pl. XXIV. fig. 13).

Antennae pale cinereous, the basal joint dark fuscous. Palpi pale cinereous, with a fuscous shade along the outer side of the median joint, on its basal half, and a fuscous spot before its apex; terminal joint with a fuscous spot at its base externally and a shade of the same colour before its apex. Head and Thorax pale cinereous; tegulae brownish fuscous. Forewings pale cinereous, with a broad brownish fuscous streak from the base, reaching along the fold to three-fourths of its length, thence diverted upward and attenuated to a point at the end of the cell beyond which is a small fuscous spot; the space between this streak and the dorsum is about half the width of that which separates it from the costa; the streak itself is diluted in parts to a paler tint, becoming almost ferruginous, and the apical and terminal portion beyond it is somewhat thickly overlaid with bronzy scaling and on the costal portion are a few broken lines of brownish fuscous scales along the veins; cilia pale cinereous, with a broken bronzy line along their base, sending out obscure dentate spots at and around the apex. Exp. al. 15—18 mm. Hindwings shining, pale bronzy cinereous; cilia with a slight ochreous tinge; ♂ with an ochreous subcostal hair-pencil. Abdomen and Legs pale cinereous, with a slight ochreous tinge.

Type ♀ (25012); ♂ (25009) *Oahu*, Mus. Wlsm.

HAB. OAHU: Waianae Mts., (5) IV. 1892.—LANAI: 2000 ft., (2) I. 1894, (1) VII. 1894. Eight specimens.

309. (173) *Hyposmocoma longitudinalis*, sp. nov. (Pl. XXIV. fig. 14).

Antennae whitish, the basal joint dark brown above. Palpi white; the median joint loosely scaled beneath, shaded externally with brownish fuscous, especially towards the apex; a slender brownish fuscous line along the outer side of the terminal joint. Head dirty whitish, tinged with brownish fuscous. Thorax white, with a central line and two posterior lateral spots dark brownish fuscous, the tegulae smeared with a paler shade of the same. Forewings chalky white, with a dark brownish fuscous streak from base to apex, following the upper edge of the fold, somewhat dilated beyond the middle and attenuated to the apex, but not encroaching on the costa; in it is an indication of a triangle of slightly darker spots about the middle, two on the fold and one between them at the upper edge of the cell; the base of the dorsum and the whole of the costa is faintly shaded by a sprinkling of brownish fuscous scales, and a series of spots of the same colour, although not very distinctly defined, lies at the base of the whitish cilia on costa and termen, the dark longitudinal streak running through the cilia below the apex. Exp. al. 15—19 mm. Hindwings whitish grey, slightly dusted towards the apex; cilia pale brownish cinereous; ♂ without subcostal hair-pencil. Abdomen cinereous. Legs pale brownish cinereous.

Type ♀ (25667); ♂ (25715) *Hawaii*, Mus. Wlsm.

Hab. Oahu: gulch leading into Opaeula (Halemano), about 2000 ft., (1) i. 1893; Waialua (beach), (1) iii. 1892.—Molokai: above 3000 ft., (1) 30. v. 1893.—Hawaii: Mt. Kilauea, (1) vii. 1895; Kona, 2000—4000 ft., (2) 12. viii.—ix. 1892; Kaawaloa (Kona), above 2000 ft., (1) ix. 1892. Seven specimens.

A smaller species, with narrower and more pointed wings than *chilonella* + *chilonella*, which it resembles in pattern.

310. (174) *Hyposmocoma centralis*, sp. nov. (Pl. XXIV. fig. 15).

Antennae very pale ochreous. Palpi fuscous, the terminal joint paler than the median and sprinkled with whitish cinereous scaling above. Head and Thorax dull stone-whitish, the latter slightly streaked with fuscous scales. Forewings dull stone-whitish, minutely streaked and speckled along the veins with tawny fuscous scaling; a conspicuous dark tawny fuscous streak running from base to apex along the line of the discal cell, below which is a fuscous plical spot before the middle; a series of ill-defined fuscous spots around the apex and termen at the base of the mottled cinereous cilia. Exp. al. 27 mm. Hindwings greyish; cilia pale cinereous, mottled with whitish and grey at the extreme apex; ♂ without subcostal hair-pencil. Abdomen greyish, mottled with pale greyish ochreous on the basal half. Legs greyish, mottled with pale cinereous; the long hairs on the hind tibiae whitish cinereous.

Type ♂ (28034) Mus. Wlsm.

Hab. Kauai: Lihue, 4000 ft., vii. 1896. Unique.

The single specimen is teratological, the right hindwing having nine veins, 4 and 4^{bis} stalked.

311. (175) *Hyposmocoma chilonella*, sp. nov.

311^{a}. (175^{a}) *chilonella* Wlsm. + *triocellata*, var. nov. (Pl. XXIV. fig. 16).

Antennae pale fawn-ochreous, the basal joint shaded at the base with dark brown. Palpi whitish ochreous, the median joint tinged at its base and (usually) towards its apex with dark brown externally. Head and Thorax very pale fawn-ochreous (or bone-ochreous). Forewings pale fawn-ochreous, more or less dusted with brownish scales; at the base of the costa is a short dark brownish fuscous streak, and another at the base of the dorsum with a smaller one between them detached from the base, below which, from the middle of the base, runs a more or less interrupted brownish fuscous median streak, following the line of the discal cell, and attenuated beyond it to the end of the apical cilia; in this darkened space are two ocellated spots (each consisting of a small blackish spot surrounded by pale fawn-ochreous), one on the disc a little before the middle, the second at the end of the cell, with a similar plical spot, preceding the first discal, immediately below the dark discal streak; in some specimens the pale ground-colour almost obliterates the dark discal streak, and the paler colour, surrounding the three dark spots, is very inconspicuous; cilia pale fawn-ochreous, with a series of brownish fuscous spots at their base (5 terminal and 4 costal), an apical spot is also noticeable when not obliterated by the dark discal streak. Exp. al. 19—28 mm. Hindwings shining, silvery whitish; cilia with a slight ochreous tinge, with a broken fuscous shade-line along their base about the apex; ♂ without subcostal hair-pencil. Abdomen very pale fawn-ochreous, sometimes with darker shading towards the base. Legs very pale fawn-ochreous, with, or without, faint darker tarsal bands.

Type ♂ (26264); ♀ (26077) *Molokai*, Mus. Wlsm.

Hab. Kauai: 3000—4000 ft., (1) v. 1894.—Molokai: about 4000 ft., (3) 22. v.—vi. 1893.—Hawaii: Kona, 3000—4000 ft., (4) 13. viii.—8. ix. 1892; Mt. Kilauea, (1) viii. 1896; Olaa, (1) ix. 1896. Ten specimens.

311^{b}. (175^{b}) *chilonella*, sp. nov. + *chilonella*, var. nov. (Pl. XXIV. fig. 17).

Antennae whitish ochreous, shaded with brown on each joint above. Palpi whitish ochreous, the median joint sprinkled at its base and towards its apex with brown. Head and Thorax whitish ochreous. Forewings whitish ochreous, with a conspicuous dark umber-brown streak, running from the middle of the base to the apex and through the apical cilia, slightly dilated towards the middle of the cell, but attenuated toward each extremity; above its base is a short oblique brown costal streak, a smaller one lying beneath its base, but not on the dorsum; above and beneath the central streak the wing is sparsely sprinkled with brownish scales, a small brown spot appearing on the fold before its middle, adjacent to the central streak; at the outer extremity are four terminal and four costal dark brown spots in the base of the whitish ochreous cilia. Exp. al. 26—33 mm. Hindwings shining, straw-whitish; cilia whitish ochreous; ♂ without subcostal hair-pencil. Abdomen whitish ochreous. Legs whitish ochreous, with a brown spot on the second tarsal joint above.

Type ♂ (27198); ♀ (26855) *Kauai*, Mus. Wlsm.

HAB. KAUAI: 3000—4000 ft., (2) VI. 1894.—HAWAII: Mt. Kilauea, (1) VII. 1895, (3) VIII. 1896. Six specimens.

In this variety the discal spots are obliterated by the dark central streak and in some specimens the plical spot also.

311^c. (175^c) *chilonella*, Wlsm. + *venosa*, var. nov. (Pl. XXIV. fig. 18).

Antennae cinereous, the basal joint umber-brown. Palpi pale cinereous, the median joint shaded externally towards its base and before its apex with umber-brown. Head whitish cinereous, a slight brownish shade posteriorly. Thorax pale cinereous, much suffused with umber-brown. Forewings pale cinereous, with all the veins more or less distinctly indicated throughout by umber-brown lines, among which the plical, and two discal spots are scarcely distinguishable; the basal spots are also traceable; cilia pale cinereous, broken along their base by umber-brown spots opposite to the ends of the dark lines between the veins. Exp. al. 24—35 mm. Hindwings and cilia shining, straw-whitish, with four dark spots around the apex at the base of the cilia; ♂ without subcostal hair-pencil. Abdomen and Legs shining, pale cinereous.

Type ♂ (26837) *Kauai*; ♀ (25206) *Hawaii*, Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (1) VI. 1894.—MOLOKAI: about 4000 ft., (1) 9. V. 1893.—HAWAII: Mt. Kilauea, (3) VIII. 1896; Kona, above 2000 ft., (1) IX. 1892. Six specimens.

311^d. (175^d) *chilonella*, Wlsm. + *percondita*, var. nov. (Pl. XXIV. fig. 19).

Antennae fuscous, annulate with pale ochreous. Palpi fawn-brown. Head and Thorax umber-brown. Forewings umber-brown, with a slight admixture of pale fawn-ochreous, especially about the cell and around the darker fuscous spots, of which there are five specially noticeable, but somewhat diffused and indistinctly indicated; one at the extreme base below the costa, one at the extreme base of the dorsum, one on the middle of the fold, a larger one on the cell a little above and beyond it, and a small one at the end of the cell, with a slight streak between the two; a series of fuscous spots also occurs in the base of the brownish fawn cilia around the apex and termen. Exp. al. 28—34 mm. Hindwings shining, pale brownish fawn; cilia fawn-ochreous, spotted on their base around the apex; ♂ without subcostal hair-pencil. Abdomen fawn-ochreous. Legs fawn-ochreous, the tarsi broadly banded with fuscous.

Type ♂ (28737) *Hawaii*, Mus. Wlsm.

HAB. KAUAI: Lihue, 4000 ft., (1) VII. 1896.—HAWAII: Mt. Kilauea, (7) VIII. 1896. Eight specimens.

Some specimens are paler than the type and lose the marginal spots.

The descriptions of the varieties of this species show a wide range of difference in intensity and distribution of colour. I had originally regarded them as distinct, but the intergradations are numerous and it appears to me to be one of the rare instances in which a species ranging over several of the islands fails to establish for itself any recognisable local form. The size as well as the colour of the specimens is very variable and this difference is to be found in connection with each separate pattern or peculiarity. If anyone had before him the varieties described above without the intermediate gradations he would undoubtedly regard them as distinct species, but in the absence of a knowledge of their life-histories it seems preferable to describe them as varieties rather than species.

312. (176) *Hyposmocoma epicharis*, sp. nov. (Pl. XXIV, fig. 20).

Antennae pale ochreous, the basal joint slightly shaded above with fuscous. Palpi pale ochreous. Head whitish ochreous. Thorax pale ochreous. Forewings pale ochreous, sprinkled with pale fawn-ochreous scales, more profusely about the base and below the fold; with three small brownish spots, one in the middle of the fold, one above and beyond it on the cell and another at the end of the cell; cilia pale ochreous. Exp. al. 30 mm. Hindwings shining, straw-whitish; the cilia with an ochreous tinge. Abdomen (missing). Legs whitish ochreous.

Type ♀ (25164) Mus. Wlsm.

HAB. MOLOKAI: above 3000 ft., 24. VI. 1893. Unique.

313. (177) *Hyposmocoma subnitida*, sp. nov. (Pl. XXIV. fig. 21).

Antennae straw-whitish, barred above with fuscous; the basal joint fuscous. Palpi straw-whitish, the median joint grey externally; with two slender grey lines along the under side of the terminal joint. Head and Thorax straw-whitish. Forewings shining, straw-whitish, with pale straw-ochreous cilia through which run three or four brownish streaks originating in spots at their base; a short fuscous streak at the extreme base of the costa; (in one specimen, ♂ 27441, there are two discal spots, the first at the end of the cell, the other slightly before the middle, and a few fuscous scales are scattered about the apical half of the wing, the latter occur in more than one specimen). Exp. al. 18—20 mm. Hindwings shining, grey; cilia greyish ochreous; ♂ without subcostal hair-pencil. Abdomen straw-ochreous. Legs pale straw-ochreous, with pale fuscous tarsal bands.

Type ♂ (27436); ♀ (27439) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, (3) VI.—VII. 1895; Kona, 4000 ft., (3) VII.—13. VIII. 1892; Hualalai (Kona), 5000 ft., (1) 5. VIII. 1892. Seven specimens.

A somewhat more distinct variety also occurs (♂ 25222) in which the spots are represented by cloudy accumulations of scales and the scattered fuscous scaling is more condensed on the apical half of the wing, the lines in the cilia being sometimes blended into a continuous shade.

26. HYPERDASYS, gen. nov.

(ὑπέρδασυς = very hairy.)

Type *Hyperdasys cryptogamiellus* Wlsm.

Antennae shorter than the forewings; ♂ shortly uniciliate, serrate towards the apex: ♀ simple. Labial Palpi recurved, smooth; ♂ with the terminal joint slightly longer than the median, the two gradually tapering to an acute apex; ♀ with the terminal joint more slender and slightly longer than in the ♂. Maxillary Palpi short. Haustellum well-developed. Ocelli absent. Head thickly clothed above, the scales more or less upstanding. Thorax smooth. Forewings elongate, narrow, lanceolate to the apex, termen very oblique; ♂ with a long fold or flap, from the base to two-thirds on the underside of the costa, fringed with long cilia, beneath it on the upper edge of the cell is an expansible fringe of hair-scales as long as the width of the wing: neuration 12 veins; 7 and 8 stalked, 7 to costa; 3 from before angle of cell, 3 and 5 approximated to 4. Hindwings as broad as the forewings, obtusely rounded at the apex, with long dorsal cilia; ♂ and ♀ with limbal hair-pencil, subcostal hair-pencil absent: neuration 8 veins, all separate; 6 and 7 approximating towards base; 5 almost straight; 2, 3 and 4 remote, 2 recurved. Abdomen slender. Legs, hind tibiae somewhat hairy above, spurs and tarsi long and slender.

314. (1) *Hyperdasys semiustus*, sp. nov. (Pl. XXIV. fig. 22).

Antennae dark brown to two-thirds their length, thence pale ochreous, the basal joint tipped with pale ochreous. Palpi, with the median joint pale ochreous, shaded with dark brown externally before its apex; terminal joint dark brown.

Head pale ochreous. Thorax dark brown; tegulae pale ochreous, shaded with brown. Forewings very pale ochreous towards the costa where they are only slightly shaded with dark brown; dark umber-brown on the dorsal two-thirds and at the apex, slightly mixed with pale ochreous; three dark brownish fuscous spots, one on the middle of the fold, a larger one above and beyond it on the cell, a third at the end of the cell; in addition to these is a very small one at the extreme base of the costa and a distinct terminal series, those at and above the apex running through the pale ochreous cilia, those below the apex (to the number of five) confined to the base of the pale ochreous cilia, a narrow pale ochreous terminal line marking the margin before them. Exp. al. 17—24 mm. Hindwings pale leaden grey; cilia pale brownish ochreous. Abdomen brownish ochreous. Legs pale ochreous, the hind tibiae with brownish bands across them.

Type ♂ (26860); ♀ (27196) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (1) IV. 1895; Mts., 3000—4000 ft., (5) VI. 1894. Six specimens.

In *semiustus* the costal fold has shorter cilia than in the typical species.

315. (2) *Hyperdasys arundinicolor*, sp. nov. (Pl. XXIV. fig. 23).

Antennae tawny grey. Palpi, ♂ tawny greyish fuscous on their outer sides, with a slender whitish ochreous line running along the under side, the whole inner side much paler than the outer: ♀ dark tawny grey, the median joint slightly washed with pale ochreous above. Head and Thorax, ♂ pale ochreous, the latter with a tawny fuscous median streak, the base of the tegulae also tawny fuscous: ♀ dark tawny grey, a slender ochreous lateral streak above each eye. Forewings, ♂ pale ochreous, with a pale tawny suffusion, commencing in a patch at the base of the costa and extending outward along the middle to beyond the end of the cell, dilated downwards as far as the fold; in it a darker spot on the middle of the fold, another above and a little beyond it on the cell, a third at the end of the cell, with a series of smaller spots around the apex and termen at the base of the pale ochreous cilia which are tinged with tawny grey at the apex: ♀ with the costa, apex and dorsum tawny brown with a greyish tinge; a broad pale ochreous streak running from the middle of the base nearly to the termen, its lower margin scarcely below the fold, its upper edge somewhat clearly defined along the middle of the cell, at the end of which is a small dark spot; there is also a narrow spot in the fold a little beyond the middle, another above and a little beyond it being sometimes indicated; cilia brownish grey. Exp. al. ♂ 17—♀ 21 mm. Hindwings shining, pale leaden grey; cilia pale greyish ochreous. Abdomen greyish, darker in the ♀. Legs pale greyish.

Type ♂ (27093); ♀ (27071) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., V.—VI. 1894. Five specimens.

316. (3) *Hyperdasys unicolor*, sp. nov. (Pl. XXIV. fig. 24).

Antennae testaceous. Palpi and Head pale testaceous. Thorax and tegulae dark reddish fawn. Forewings dark reddish fawn, with three faintly indicated slightly darker spots; two on the disc a little before the middle of the wing, the lower one placed obliquely a little beyond the upper, the third at the end of the cell; cilia testaceous. Exp. al. 20 mm. Hindwings greyish; cilia pale testaceous. Abdomen dull fawn-grey; anal tuft pale testaceous. Legs pale testaceous, the tarsi faintly blotched above with fawn-grey.

Type ♂ (26408); ♀ (26372) Mus. Wlsm.

HAB. MOLOKAI: above 4500 ft., VII. 1893; forest above Pelekunu, 21. IX. 1893. Two specimens.

The subcostal fringe is apparently somewhat shorter and less developed than in *cryptogamiellus*.

317. (4) *Hyperdasys cryptogamiellus*, sp. nov. (Pl. XXIV. fig. 25).

Antennae whitish ochreous, barred above with fuscous. Palpi whitish ochreous, the terminal joint sprinkled beneath with blackish scales from base to apex. Head stone-grey. Thorax pale stone-greyish. Forewings whitish ochreous, profusely dusted with greyish fuscous; a dark fuscous spot at the base below the middle is followed by another in the middle of the fold; above and beyond this is an elongate spot a little beyond the middle of the cell, followed by another at its outer edge; a series of smaller dark fuscous spots along the base of the pale ochreous costal and terminal cilia. Exp. al. 16—20 mm. Hindwings greyish; cilia pale ochreous. Abdomen pale ochreous. Legs whitish ochreous, shaded with pale greyish fuscous.

Type ♂ (27462); ♀ (28109) *Hawaii*, Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (3) V. 1894.—OAHU: Waianae Mts., 3000 ft., (4) IV. 1892.—MOLOKAI: above 3000 ft., (6) 30. V.—12. VII. 1893.—LANAI: 2000 ft., (1) II. 1894.—HAWAII: Kona, 2000—3500 ft., (1) 25. VI. 1892, (8) IX.—X. 1892; Olaa, (1) VII. 1895; Mt. Kilauea, (1) VII. 1895, (3) VIII. 1896. Twenty-eight specimens.

This species varies considerably in its colouring and in the shape and intensity of the spots. In some specimens a small spot, or streaklet, appears a little removed from the base beneath the costa; in some the first discal spot is divided into two parts. Some varieties are much paler than others, assuming a pale bone-colour, these are more or less obscurely streaked with brownish fuscous shading, nowhere concentrated. The generic character of the bold fringe of hair-scales arising from the edge of the costa beneath is always apparent in the male.

27. EUPERISSUS, Btl.

(εὖ = well ; περισσός = extraordinary.)

Type *Euperissus cristatus* Btl. (Btl. 1881).

EUPERISSUS, Btl., Ann. & Mag. NH. (5. s.) VII. 401—2, fig. 1 (1881).

Antennae, ♂ nearly as long as the forewings, ciliate 2½, gradually diminishing to the middle, serrate beyond the middle ; basal joint without pecten : ♀ simple. Ocelli absent. Maxillary Palpi moderate, dependent. Labial Palpi recurved to above the vertex ; median and terminal joints of about equal length ; smooth, both joints appearing grooved throughout through the slight projection of the lateral scaling. Haustellum scaled throughout. Head smooth, side-tufts appressed, meeting in the median line. Thorax smooth. Forewings elongate, narrow, apex slightly depressed, pointed, termen obliquely rounded : neuration 12 veins ; 7 and 8 stalked, 7 to costa ; 2 from ⅔ ; 3 from midway between 2 and 4 ; 5 nearer to 4 than to 6 ; 12 very long ; 10 nearer to 9 than to 11 ; an internal vein from base of 6 to beyond 11. Hindwings as broad as the forewings, apex depressed, obtusely pointed, termen obliquely rounded, dorsum almost parallel with costa ; ♂ with a fringe of hair-scales along lower edge of cell from the base to its middle ; ♂ and ♀ with a long, expansible, limbal hair-pencil, longer in the ♂ than in the ♀ : neuration 8 veins, all separate ; 2, 3 and 4 remote at origin ; 2 recurved ; 5 nearer to 4 than to 6 ; 6 and 7 separate, almost parallel ; 8 not connected with cell. Abdomen rounded. Legs long, hind tibiae with short hairs.

Apparently related to *Orthotaelia*, Stph., which however has 7 and 8 of the forewings separate.

318. (1) *Euperissus cristatus* Btl. (Pl. XXIV. fig. 26).

Euperissus cristatus Btl., Ann. & Mag. NH. (5. s.) VII. 401—2, No. 40, fig. 1 (1881)[1].

Antennae brownish grey, the serrations on the outer half blackish ; basal joint blackish. Labial Palpi whitish ochreous on the inner side, shaded with grey on the outer side of the second joint ; a slender whitish ochreous line beneath from base to apex, margined on either side with blackish. Maxillary Palpi whitish ochreous. Head and Thorax brownish ochreous, the base of the tegulae greyish fuscous. Forewings pale leaden grey, suffused with a brownish ochreous tinge from the base, extending along the fold and along the discal cell ; with three large black spots, one in the fold beyond its middle, another on the cell straight above it, a third at the end of the cell, [in some specimens these spots are not so distinct, and there are indications of very indistinct spots towards the base] ; cilia brownish ochreous, with a series of ten blackish dentate spots along their base (six terminal and four costal). Exp. al. 30—35 mm. Hindwings leaden grey ; ♂ with a fringe of brownish ochreous hair-scales along the lower edge of the cell reaching from the base to its middle ; on the limbus is a long pencil of brownish ochreous hair-scales ; ♀ with the limbal hair-pencil, but without the cilia along the edge of the cell ; cilia scarcely paler than the wings, with an indication of four obscure darker spots in their base below the apex. Abdomen greyish fuscous, with a brownish ochreous patch near the base. Legs pale leaden greyish, tinged with ochreous on their inner sides.

Type ♂ (72: 81. 7) Mus. Br. [Caenotype ♂ (28650) ; ♀ (28593) Mus. Wlsm.]

HAB. OAHU: Mts. near Honolulu (Blackburn)[1].—MOLOKAI: above 3000 ft., 5. VI. 1893 (Perkins).—HAWAII: Olaa, 2000 ft., IX., XI. 1896; Hilo, 2000 ft., XII. 1895 (Perkins). Four specimens.

Females of this species can be distinguished from those of the very similar *Semnoprepia fulvogrisea*, Wlsm., by the grooved appearance of the palpi and by the possession of two spots before the discoidal on the forewings.

28. SEMNOPREPIA, gen. nov.

(σεμνοπρέπεια = a solemn bearing.)

Type *Semnoprepia fulvogrisea* Wlsm.

Antennae, ♂ nearly as long as the wings, biciliate 2½, gradually diminishing to the middle, serrate beyond the middle ; basal joint without pecten : ♀ simple. Maxillary Palpi moderate, dependent. Labial Palpi recurved to above the vertex, terminal joint as long, or longer than median ; smooth. Haustellum scaled at base. Head smooth, side-tufts appressed. Thorax smooth. Forewings elongate, narrow, apex slightly depressed ; neuration 12 veins; 7 and 8 stalked, 7 to costa; 3 and 5 approximated to 4, 3 from before angle ; 12 very long, 10 approximated to 9; an internal vein from base of 6 to beyond 11. Hindwings as broad as forewings, apex depressed, obtusely pointed, termen obliquely rounded, dorsum almost parallel with costa ; ♂ and ♀ with expansible limbal hair-pencil : neuration 8 veins, all separate ; 2, 3 and 4 remote at origin, 2 recurved ; 5 approximated to 4 ; 6 and 7 separate, almost parallel ; 8 not connected with cell. Abdomen rounded. Legs long, hind tibiae with short hairs.

Closely allied to *Euperissus*, Btl., but differing in the absence of the fringe of hair-scales along the lower edge of the cell in the hindwings of the ♂. Apparently related to *Orthotaelia*, Stph., but differing in having 7 and 8 of the forewings stalked.

319. (1) *Semnoprepia fulvogrisea*, sp. nov. (Pl. XXIV. fig. 27).

Antennae tawny grey. Palpi tawny grey, paler on their inner sides. Head and Thorax tawny grey. Forewings tawny grey, with a dark fuscous, somewhat crescent-shaped, spot at the end of the cell ; cilia pale tawny grey, with alternate dark fuscous and whitish ochreous spots along their base, forming a series of about ten (four costal and six terminal). Exp. al. 25—27 mm. Hindwings paler, tawny grey, with a faintly indicated darker spot at the end of the cell, and some ochreous streaks and intermediate dark shades at the base of the tawny grey cilia toward the apex. Abdomen shining, pale grey, with a slight ochreous tinge above towards the base. Hind Legs tawny grey, with pale spots at the terminations of the tarsi and tibiae, spurs pale.

Type ♂ (26951); ♀ (26952) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (1) IV. 1895; Mts., 3000—4000 ft., V.—VI. 1894. Seven specimens.

Very similar to *Euperissus cristatus*, Btl., but lacking the spot in the fold and that above it on the cell.

320. (2) *Semnoprepia petroptilota*, sp. nov. (Pl. XXIV. fig. 28).

Antennae brownish cinereous, the basal joint fuscous. Palpi whitish ochreous, shaded externally and round the terminal joint with slaty fuscous. Head whitish ochreous. Thorax pale slaty fuscous. Forewings pale brownish cinereous, profusely sprinkled with fuscous, with a small dark fuscous spot on the middle of the fold, a larger one on the disc above and beyond it, a third at the end of the cell and a series of fuscous spots at the base of the pale brownish cinereous cilia on the costa apex and termen. Exp. al. 19—21 mm. Hindwings greyish; cilia brownish cinereous, with shade-spots at their base near the apex. Abdomen brownish grey; anal tuft whitish ochreous. Legs pale slaty fuscous, with pale cinereous tarsal annulations.

Type ♂ (28746) *Hawaii*, Mus. Wlsm.

HAB. MAUI: Olinda (Haleakala), 4000 ft., (2) V. 1896; Haleakala, 5000 ft., (1) V. 1896.—HAWAII: Mt. Kilauea, (3) VIII. 1896. Six specimens.

The ♀ is at present unknown unless it has been wrongly referred to *Hyperdasys cryptogamiellus*.

321. (3) *Semnoprepia margella*, sp. nov. (Pl. XXV. fig. 1).

Antennae pale stone-greyish, the basal joint fuscous. Palpi pale stone-greyish, tinged with pale slaty greyish externally. Head whitish ochreous. Thorax stone-grey, tinged with slaty grey. Forewings stone-whitish along the middle, the margins and apex suffused with slaty greyish fuscous; an elongate dark fuscous spot on the middle of the fold lies a little nearer to the base than a somewhat similar spot on the cell, the latter throwing out projections in the direction of a smaller lunate spot of the same colour at the end of the cell; a broken line of the pale ground-colour around the termen and apex is succeeded by a dark fuscous shade, at the base of the whitish cinereous cilia, broken into dentate spots along the termen. Exp. al. 20 mm. Hindwings greyish;

cilia pale brownish grey. Abdomen dark slaty fuscous. Legs brownish grey, with paler mottling.

Type ♂ (28743) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VIII. 1896. Unique.

It is possible that this may be a variety of *petroptilota*, but the specimens before me present no intermediate forms.

29. DIPLOSARA, Meyr.

Type *Scardia lignivora*, Btl. (Meyr. 1883).

DIPLOSARA, Meyr., Ent. Mo. Mag. XX. 35 (1883).

Antennae rather stout, serrate; ♂ more strongly serrate, each serration with a fascicle of short cilia (½); basal joint moderate, without pecten. Maxillary Palpi rudimentary, short, drooping. Labial Palpi moderately long, recurved; median joint considerably thickened above and beneath with dense, somewhat rough scales, attenuated towards base; terminal joint as long as median, acute, posterior edge from base nearly to apex clothed with long, dense, obliquely projecting scales. Ocelli absent. Haustellum strong, scaled. Head with appressed scales. Thorax not crested. Forewings elongate, narrow, apex obtusely pointed, termen obliquely rounded, dorsum somewhat excavate from vein 3 to 1; surface with large tufts of raised scales: neuration 12 veins; 7 and 8 stalked; 3 approximated to 4; 4 from angle of cell; 5 closely approximated to 4, remote from 6; 11 from middle of radius; 10 approximated to 9; media almost obsolete. Hindwings as broad as forewings, elongate-ovate, cilia rather long (1); ♂ with costal fold containing an expansible subcostal hair-pencil: neuration 8 veins; 6 remote from 5, gradually approximated to 7 at base; 8 free, not connected with middle of cell by transverse vein; 3 about equidistant from 2 and 4; 4 from angle of cell, 4 and 5 normally stalked, but sometimes connate or even separated by a small space; discoidal weak; media strong from 6 to base. Abdomen not depressed, ♂ genital segments well-developed; ♀ with ovipositor extruded. Legs, posterior tibiae clothed above with long dense hairs.

Larva in a flattened case rounded at either end somewhat resembling an old-fashioned spectacle case; feeding on rotten wood.

The above description is largely copied from Meyrick (*l. c.*) but some additions and modifications have been rendered necessary after carefully studying a long series presenting considerable variation in the neuration of the hindwings.

The series of *Diplosara lignivora*, Btl., consists of 48 (13 ♂ + 35 ♀) specimens; of these 23 (8 ♂ + 15 ♀) have veins 4 and 5 of the hindwings stalked, in some the stalk is short (almost connate), in others it is long or very long; 7 (1 ♂ + 6 ♀) specimens have these veins connate in one wing and stalked in the other, the length of the stalk varying; 8 (2 ♂ + 6 ♀) specimens have veins 4 and 5 connate in both wings; 3 (♀) specimens have these veins connate in one wing and very closely approximated in the other, while 7 (2 ♂ + 5 ♀) have them very closely approximated in both wings. One specimen (28675, ♀) from Kauai, belonging to the series with 4 and 5 connate, is teratological, with nine veins, 3 and 3^{bis} being stalked.

These variations do not appear to be dependent on locality. The greatest variation is shown in the series of 27 from Hawaii (12 ≺; 7 <≺; 4 <; 4 ⊏). Only 2 specimens were received from Lanai (1 ≺; 1 <≺). The 7 specimens from Molokai do not vary, all being ≺. Oahu 4 specimens (3 ≺; 1 ⊏). Kauai 8 specimens (2 <≺; 4 <; 2 ⊏), in this series no specimen is ≺ in both wings.

Diplosara lignivora is very variable in size and appearance but such variation is individual and cannot be correlated with locality or with neuration.

322. (1) *Diplosara lignivora*, Btl. (Pl. XXV. fig. 2).

Scardia lignivora, Btl., Ent. Mo. Mag. xv. 273 (1879)[1]. *Diplosara lignivora*, Meyr., Ent. Mo. Mag. xx. 35 (1883)[2]; Sharp, Camb. NH. vi. (Ins. ii.) 429, fig. 207 (1899)[3].

Antennae pale cinereous, with dark brownish annulations, the basal joint dark brown. Palpi pale cinereous, shaded on the outer sides with a sprinkling of brownish fuscous scales, very noticeable at the base and before the apex of the terminal joint. Head pale cinereous, sprinkled with brown above. Thorax dark brown, with pale cinereous sprinkling. Forewings pale cinereous, profusely shaded with olivaceous brown and brownish fuscous, the latter forming a conspicuous large costal triangle, its apex reaching to the fold; several patches of raised scales precede this above and below the fold and one at least follows it resting on the outer end of the fold; a fuscous spot at the end of the cell is surrounded by whitish cinereous, the subapical shade varies in intensity, in some specimens olivaceous brown with brownish fuscous assuming a triangular form upon it; in others almost losing the dark triangular shade which is replaced by some sprinkling, a series of semidetached dark brownish fuscous spots occurring around the termen and apex; cilia pale cinereous, profusely dusted and shaded with olive-brown. Exp. al. 22—36 mm. Hindwings rosy greyish; cilia and subcostal hair-pencil pale brownish cinereous. Abdomen pale olive-brown. Legs pale cinereous, with brownish fuscous bands across the ends of the tibiae and on the tarsi.

Type ♂ ♀ (56 : 79. 8) Mus. Br. [Caenotype (25657) Mus. Wlsm.]

Hab. Kauai: Kaholuamano, 4000 ft., iv. 1895, 3000—4000 ft., v. 1894, vi. 1894; Waimea Mts., 4000 ft., v. 1894 (Perkins).—Oahu: "Bred from larvae feeding on very rotten wood, in mountain forests" (Blackburn)[1]; Waianae Mts., 3000 ft., iv. 1892, larvae in decaying wood, vi. excl. ...... 1893; near head of Kawailoa Gulch, iv. 1893 (Perkins).—Molokai: Mts., 4000 ft., larva in dead wood excl. 5—26. vii. 1893 (Perkins).—Lanai: 2000 ft., i. 1894, vii. 1894 (Perkins).—Hawaii: Olaa, vi., vii., ix. 1895; Olaa, 2000 ft., XI. 1896; Kona, 4000 ft., 29. VI., 12—15. VIII. 1892, above 5000 ft., 30. VIII. 1892, 3000 ft., IX. 1892; Mt. Kilauea, VIII. 1896; Hilo, 2000 ft., XII. 1895, I. 1896 (Perkins). Forty-eight specimens.

30. BLASTOBASIS, Z.

Type *Oecophora* (*Scythris*) *phycidella*, Z.

BLASTOBASIS, Z., Lin. Ent. X. 171 (1855); Hein., Schm. Deutsch. Tin. 387 (1870); Stgr.-Wk., Cat. Lp. Eur. 309, No. 257 (1871); Wlsm., Pr. Z. Soc. Lond. 1897, 91; Stgr.-Rbl., Cat. Lp. Pal. II. 163, No. 351 (1901); Dyar, Bull. US. Nat. Mus. **52**. 528 (1902).

323. (1) *Blastobasis inana*, Btl. (Pl. XXV. fig. 3).

Gracilaria inana, Btl., Ann. & Mag. NH. (5. s.) VII. 404, No. 44 (1881)[1].

Antennae fawn-brown, notched beyond the dilated basal joint which is whitish ochreous. Palpi whitish ochreous, fawn-brown externally, except at the apex of the median joint. Head whitish ochreous. Thorax pale fawn-ochreous, shaded across the anterior half with greyish fuscous. Forewings pale fawn-ochreous, with very indistinct pale fawn-brownish markings, consisting of a slight shade across the extreme base of the wing, a small spot a little beyond the middle of the discal cell, followed by another at its outer extremity, a slight costal shade above each of these two spots, a slight shade at the tornus and a series of six or seven very indistinct marginal spots around the apex and termen; cilia very pale fawn-ochreous. Exp. al. 11—15 mm. Hindwings brassy grey; cilia pale fawn-ochreous. Abdomen and Legs pale fawn-ochreous.

Type ♀ (112: 81. 7) *Oahu*, Mus. Br. [Caenotype ♀ (26460); ♂ (25124) Mus. Wlsm.]

HAB. OAHU: Honolulu (Blackburn)[1]; Waianae Mts., 3000 ft., IV. 1892; near head of Kawailoa Gulch, IV. 1893 (Perkins).—LANAI: 2000 ft., II. 1894 (Perkins). Five specimens.

This species has only 7 veins in the hindwings as in the European species, and is therefore unlikely to have been introduced from America although I have received a specimen with the note "Tineid bred from Yam. Introduced" (No. 9 Perkins; 1865 Koebele).

31. ENDROSIS, Hb.

Type *Tinea lactella*, Schiff. (Z. 1839).

ENDROSIS, Hb., Verz. Schm. 401 (1826); Z., Is. **1839**, 191; Stn., Ins. Br. Lp. Tin. 163—4, Pl. V. 8^{a-c} (1854); Meyr., HB. Br. Lp. 688 (1895); Stgr.-Rbl., Cat. Lp. Pal. II. 163, No. 350 (1901); Dyar, Bull. US. Nat. Mus. **52**. 543 (1902).

324. (1) *Endrosis lactella*, Schiff.

=*betulinella*, Hb.; =**sarcitella*, Hw. (nec L.); =*sarcitea*, Hw.; =*fenestrella*, Stn. (?Sc.); =*kennicottella*, Clms.; =*lacteella*, Stgr.-Wk., etc.
Tinea lactella, Schiff., S-V. Schm. Wien 139, No. 37 (1776). *Tinea betulinella*, Hb., Sml. Eur. Schm. viii. Tin. Pl. 3, 20 (1801), Pl. 67, 448 (1822). *Endrosis betulinella*, Hb., Verz. Schm. 401, No. 3874 (1826). *Tinea sarcitella*, Hw., Prodr. Lp. Br. 38, No. 88 (1802). *Anacampsis sarcitea*, Crt., Br. Ent. iv. expl. Pl. 189, p. 2 (1827). *Recurvaria sarcitea*, Hw., Lp. Br. 550, No. 14 (1828). *Anacampsis sarcitella*, Stph., Syst. Cat. Br. Ins. ii. 196, No. 7195 (1829): Ill. Br. Ent. Haust. iv. 210, No. 21 (1834); Wd., Ind. Ent. Pl. 39, 1207 (1839). *Laverna sarcitella*, Crt., Br. Ent. xvi. expl. Pl. 735, p. 2 (1839). *Endrosis fenestrella*, Stn., Ins. Br. Lp. Tin. 163—4, Pl. V. 8^{a-c} (1854): List Br. An. BM. xvi. Lp. 99—100 (1854). *Endrosis ? kennicottella*, Clms., Pr. Ac. Nat. Sc. Phil. xii. 165 (1860): Stn.-Clms., Tin. N. Am. pp. xi, 119 (1872). *Endrosis lacteella*, Stgr.-Wk., Cat. Lp. Eur. 323, No. 2703 (1871); Meyr., HB. Br. Lp. 688—9 (1895); Stgr.-Rbl., Cat. Lp. Pal. ii. 163, No. 3051 (1901); Dyar, Bull. US. Nat. Mus. **52.** 543, No. 6170 (1902).

HAB. EUROPE. ASIA. AFRICA. N. AMERICA. AUSTRALIA. NEW ZEALAND. HAWAIIA. HAWAII: Kona, 4000 ft., vii.—viii. 1892. Three specimens.

32. OECIA, Wlsm.

Type *Oecia maculata*, Wlsm.

OECIA, Wlsm., Pr. Z. Soc. Lond. **1897**, 111, No. 44 (1897).

325. (1) *Oecia maculata*, Wlsm. (Pl. XXV. fig. 4).

Oecia maculata, Wlsm., Pr. Z. Soc. Lond. **1897**, 111—2, No. 138 (1897)[1].

"Antennae smoky greyish. Palpi pale ochreous. Head pale straw-ochreous. Thorax pale straw-ochreous, shaded with smoky grey. Forewings pale straw-ochreous, blotched and margined with smoky grey; this colour commencing near the base extends along the fold and along the costa without including the costal cilia and embraces the apex; on the middle of the fold is a stronger blotch of the same colour, slightly diffused downwards to the dorsum; a similar blotch a little above and beyond it scarcely before the middle; a third at the end of the cell extending almost across the wing; cilia pale straw-ochreous. Exp. al. 10—12 mm. Hindwings shining, pale yellowish grey; the cilia with a slight ochreous tinge. Abdomen pale ochreous. Legs with the tibiae and tarsi somewhat hairy; whitish ochreous." [Wlsm.[1]]

Type ♂ (7231); ♀ (7233) *St Thomas*, Mus. Wlsm.

HAB. WEST INDIES: S^T. THOMAS, 16—18. III^1. BRAZIL: Pará (Amazons), 9. X.—10. I^1. HAWAIIA. A single specimen without locality, collected by Blackburn (3639 Wlsm.) Mus. Meyrick.

Closely allied to *Endrosis lactella*, Schiff., and having apparently the same habits; very common on the inner walls of nearly every house in St Thomas. This species is extremely similar in appearance to *Tincola uterella*, Wlsm. (West Indies and Brazil).

33. MAPSIDIUS, gen. nov.

(μαψίδιος = casual.)

Type *Mapsidius auspicata*, Wlsm.

Antennae ($\frac{3}{4}$) minutely biciliate, basal joint without pecten. Maxillary Palpi short, inverted over base of haustellum. Labial Palpi moderately recurved, reaching as high as the vertex; terminal joint shorter than median. Haustellum well-developed, naked. Head and Thorax smooth, the latter wide and stout in proportion to the size of the head. Forewings elongate, lanceolate, obtusely pointed: neuration 11 veins (3 and 4 coincident), the cell extending four-fifths the length of the wing; 7 and 8 stalked, enclosing the apex. Hindwings nearly as broad as the forewings, lanceolate, obtusely acuminate: neuration 8 veins, all separate; 4 and 5 tending to approximate at base, media strong. Abdomen short in ♂. Legs, hind tibiae moderately clothed, with a tuft of scales above the posterior pair of spurs, inner spur of the first pair very long, reaching nearly to the base of the second pair.

326. (1) *Mapsidius auspicata*, sp. nov. (Pl. XXV. fig. 5).

Antennae brownish cinereous; the basal joint whitish, shaded along the upper side. Palpi white, the median joint shaded externally with brownish grey. Head greyish, face white. Thorax brownish grey, sprinkled with white. Forewings white, smeared with brownish grey along the dorsum as far as the fold, with scattered greyish fuscous spots above and beyond it; a greyish fuscous spot at the base of the costa is followed by a second diffused costal spot at about one-third from the base, beyond which the costa is again pure white to the apex, several scattered spots occurring about the upper edge of the discal area, others more or less confluent about the tornus; there is a strong fuscous spot on the dorsum at about one-sixth from the base, followed by an inwardly oblique ill-defined dorsal streak reaching upward to the fold and interrupting the brownish grey dorsal shade; cilia at the apex white, below it brownish cinereous. Exp. al. 14—15 mm. Hindwings pale brownish cinereous, with an obscure small shade-spot showing through the wing at the end of the cell; cilia slightly paler, brownish cinereous; ♂ without subcostal hair-pencil. Abdomen very pale brownish cinereous. Legs white, tibiae and tarsi banded with fuscous.

Type ♀ (27659) *Kauai*; ♂ (26494) *Lanai*, Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895.—LANAI: 2000 ft., VII. 1894. Two specimens.

327. (2) *Mapsidius quadridentata*, sp. nov. (Pl. XXV. fig. 6).

Antennae brownish grey; basal joint blue-black, with a white spot at its outer extremity. Palpi blue-black to beyond the middle of the median joint, thence white, extreme apex blackish. Head and face black in the middle, white at the sides and behind. Thorax black, with two white spots above. Forewings equally divided into blue-black and white with a faint ochreous tinge; the blue-black occupies the costal half from the base of the fold to the termen below the apex and sends out four angular tooth-like projections at even intervals into the white dorsal half, with a small one which might be counted as a fifth on the termen at the base of the snow-white cilia; above the fourth angular projection is a transverse white spot marking the termination of the very long discal cell; underside brown, cilia white. Exp. al. 28 mm. Hindwings brownish grey; cilia pale brownish. Abdomen brownish grey, anal tuft whitish. Legs regularly banded with black and white, spurs white, the last two tarsal joints blackish.

Type ♀ (26410) Mus. Wlsm.

HAB. LANAI: 2000 ft., I. 1894. Unique.

328. (3) *Mapsidius iridescens*, sp. nov. (Pl. XXV. fig. 7).

Antennae slaty grey, with green and rosy reflections on the basal joint and near it. Palpi slaty grey, paler on their inner side. Head, Thorax and Forewings slaty grey, with green and rosy reflections; cilia brownish grey. Exp. al. 27 mm. Hindwings shining, pale brownish grey; cilia brownish grey. Abdomen ochreous above and beneath. Legs slaty grey externally, ochreous on their inner sides, spurs slaty grey.

Type ♀ (26752) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., V. 1894. Unique.

34. PRAYS, Hb.

Type *Phalaena curtisella*, Don. (=*coenobitella*, Hb.), Stph. 1834.

PRAYS, Hb., Verz. Schm. 413 (1826); Stph., Ill. Br. Ent. Haust. IV. 245 (1834); Z., Is. **1839**, 191; Stn., Ins. Br. Lp. Tin. 54, 64—5, Pl. III. 4^{a-c} (1854): List Br. An. BM. XVI. Lp. 42 (1854); Meyr., HB. Br. Lp. 693, 694 (1895); Stgr.-Rbl., Cat. Lp. Pal. II. 133, No. 283 (1901).

329. (1) *Prays fulvocanellus*, sp. nov. (Pl. XXV. figs. 8—10).

Antennae greyish, the basal joint pale cinereous beneath. Palpi whitish, with a tawny shade along the outer side of the median joint and the basal half of the terminal. Head and face brownish cinereous. Thorax greyish brown. Forewings white, shaded with tawny along the costa to one-third, and along the dorsum to the end of the fold, the remainder of the wing-surface dotted with tawny spots; these have a tendency to form oblique shade-lines across the wing, parallel with the termen; the costal and dorsal shades are sometimes broken into separate spots by the white ground-colour; in some varieties a broad tawny brownish fascia, indented on its outer side on the cell is dilated to the dorsum, its inner margin tending obliquely inwards from costa to dorsum; a dark tawny triangular tornal spot in some varieties blends with the fascia, and the base of the wing is sometimes suffused with tawny brown; cilia tawny greyish, somewhat mottled with darker tawny shades; in some specimens the dark markings obliterate the white ground-colour, the wings and cilia being entirely dark fuscous. Exp. al. 8—16 mm. Hindwings purplish fuscous, semitransparent and iridescent along the cell, a bright steel-blue line along the costa; cilia purplish fuscous. Abdomen tawny brownish. Legs tawny greyish, with pale spurs and tarsal spots.

Type ♀ (27660); ♂ (27877) *Kauai*, Mus. Wlsm.

Hab. Kauai: Kaholuamano, 4000 ft., (12) iv. 1895; Halemanu, 4000 ft., (2) v. 1895.—Oahu: Waianae Mts., about 2000 ft., (8) iv. 1892.—Molokai: about 4000 ft., (1) 9. vi. 1893.—Lanai: 2000—3000 ft., (8) i.—ii. 1894.—Maui: Olinda (Haleakala), 4000 ft., (1) iv. 1894.—Hawaii: Mt. Kilauea, (3) vi. 1895; Kona, 2000—3000 ft., (6) ix.—1. x. 1892; Kaawaloa (Kona), above 2000 ft., (1) ix. 1892. Forty-two specimens.

This species varies considerably in size and in the amount of brown suffusion.

35. Plutella, Schrank.

Type *Cerostoma maculipennis*, Crt. (Schrank, 1802).

plutella, Schrank, Fn. Boica ii. (2) 169 (1802).
1 (Type) *maculipennis*, Crt. (=**xylostella* Schrank).
Stn., Ins. Br. Lp. Tin. 66, 67—8, Pl. III. $6^{a-c, e}$, IX. 8 (1854): List Br. An. BM. xvi. Lp. 43 (1854); Meyr., HB. Br. Lp. 694, 701, No. 6 (1895); Stgr.-Rbl., Cat. Lp. Pal. ii. 137, No. 292 (1901); Dyar, Bull. US. Nat. Mus. **52.** 492 (1902).

330. (1) *Plutella maculipennis*, Crt.

=**xylostella*, Hb., etc. (nec L.); =**annulatellus*, Wd. (nec Crt.); =*cruciferarum*, Z.; =*brassicella*, Fitch; =*limbipennella*, Clms. ♂; =*mollipedella*, Clms. ♀; =*cicerella*, Rndi.; =*galeatella*, Mab.; =*dubiosella*, Beut.; =" The Diamond-back Moth," Crt.
Cerostoma maculipennis, Crt., Br. Ent. ix. expl. Pl. 420, p. 2 (1832) ♀. *Cerostoma*

xylostella*, Crt., Jr. R. Agr. Soc. Engl. III. 24—5, 30, 32, Pl. IV. 34—7 (1842): Farm Ins. 85—7, fig. No. 10^{9-12}, 92, 93, Pl. C. 9—12 (1860). *Plutella cruciferarum*, Z., Stett. Ent. Ztg. IV. 281—3 (1843); Stn., Ins. Br. Lp. Tin. 68, Pl. III. 6^{a-c}, IX. 8 (1854): List Br. An. BM. XVI. Lp. 43—4, No. 1 (1854); Meyr., HB. Br. Lp. 702 (1895). *Plutella maculipennis*, Wlsm. & Drnt., Ent. Mo. Mag. XXXIII. 173—5 (1897); Stgr.-Rbl., Cat. Lp. Pal. II. 137, No. 2447 (1901); Dyar, Bull. US. Nat. Mus. **52. 492, No. 5503 (1902). *Plutella cruciferarum*, Quanjer, Tijd. Ent. XLIX. 11—17, Pl. I—II. (1906), etc., etc.

HAB. EUROPE. ASIA. AFRICA. AMERICA. AUSTRALIA. NEW ZEALAND. OCEANIA.—"Probably wherever man eats cabbages" (Stn.). HAWAIIA. Kauai: Kaholuamano, 4000 ft., IV. 1895.—Molokai: sea-level, V. 1893.—Hawaii: Kona, 1500—4000 ft., IX. 1892. Eleven specimens.

331. (2) *Plutella albovenosa*, sp. nov. (Pl. XXV. fig. 11).

Antennae dirty white, with very faint darker bars above near the tip. Palpi dirty white, the outer side of the median joint and the tuft streaked with yellowish brown. Head dirty white. Thorax dull white, tegulae yellowish brown. Forewings yellowish brown, the costal half and the terminal portion with slender dirty white lines along the veins; a darker brown streak runs from the base nearly to the end of the cell where there is a roundish semi-detached spot; the dirty white dorsal streak, sometimes with a yellowish tinge, throws up a slight excrescence into the dark streak about the middle of the wing, but is not sinuate before it; there are no dark marginal spots on the dorsum; cilia brownish, with a whitish line along their base. Exp. al. 12—13 mm. Hindwings and cilia brownish grey. Abdomen and Legs brownish grey.

Type ♂ (25605) *Hawaii*; ♀ (25946) *Oahu*, Mus. Wlsm.

HAB. Oahu: Waialua (beach), (2) III. 1892; Mt. Kaala, 1000—2000 ft., (1) III. 1892.—Hawaii: Kona, 4000 ft., (1) VII. 1892. Four specimens.

This species differs from *maculipennis*, Crt., noticeably in the marking out of the veins on the costal half of the forewings by white lines, in which it agrees with *rectivittella*, Z., from Bogota, but from this species it differs in the presence of an angular excrescence at the upper edge of the white dorsal streak. If *rectivittella* can rightly be regarded as a species distinct from the cosmopolitan *maculipennis* then *albovenosa* has at least equal claims, but as the ordinary form is undoubtedly associated with it in Hawaiia it is quite possible that the distinctions relied upon may prove to be merely varietal, since all the points of difference mentioned by Zeller in his description of the South American species appear to come within the range of variation exhibited by the common form. In a very lengthy series from wide geographical range I have found no variety of *maculipennis* exhibiting the distinctly marked lines of veining on the costal half of the wing which characterise *rectivittella* and *albovenosa*.

IV. CARPOSINIDAE.

36. HETEROCROSSA, Meyr.

Type *Gelechia adreptella*, Wkr. (Meyr. 1882).

HETEROCROSSA, Meyr., Pr. Lin. Soc. NSW. VII. 178—9 (VIII. 1882); NZ. Jr. Sc. I. 278 (XI. 1882): Tr. NZ. Inst. XV. 66 (1883): XVII. 148 (1885).

Meyrick employed male structures in defining this genus; he was unacquainted with the males of *neurophorella*, Meyr., and *gonosemana*, Meyr., but he possessed both sexes of *adreptella*, Wkr. († *abreptella*, Meyr.)—it is therefore obvious that *adreptella* is the type of the genus.

332. (1) *Heterocrossa plumbeonitida*, sp. nov. (Pl. XII. fig. 11).

Antennae grey. Palpi (♀) projecting three times the length of the head beyond it, median joint porrect, pale grey, minutely speckled with fuscous; terminal joint suberect, tawny fuscous, tipped with pale grey. Head grey. Thorax yellowish green, shaded with leaden grey. Forewings dull olive-green, with transverse bands and mottlings of shining, pale leaden grey; several tufts of mixed green and grey scales about the basal part of the wing are followed by a yellowish green reduplicated patch of slightly raised scales at the end of the cell, its outer edges whitish on the extreme costa, the upper extremities of the pale plumbeous bands are narrowly whitish; cilia leaden grey. Exp. al. 18 mm. Hindwings very pale greyish, the cilia with a slight ochreous tinge. Abdomen tawny grey. Legs pale cinereous.

Type ♀ (26767); ♂ (27576) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (1) IV. 1895; Mts., 3000—4000 ft., (1) V. 1894. Two specimens.

In the hindwings the cubitus is pectinate in both sexes.

333. (2) *Heterocrossa graminicolor*, sp. nov. (Pl. XII. fig. 12).

Antennae white, a fuscous bar above on the second joint. Palpi white, a broken fuscous shade along the outer side of the median joint and a ring around the middle of the apical joint. Head dirty whitish. Thorax dirty whitish, sprinkled with greyish fuscous. Forewings pale grass-green, inclining to whitish about the base, sprinkled throughout with blackish scales; a series of costal spots, diminishing from the base outward, brownish fuscous; the first, at the base, elongate, with raised ochreous scales along its margin; the second, at about one-third, also with a tuft of raised ochreous scales at its lower extremity; a little before and below this is a raised tuft of ochreous scales below the fold, followed by another on the fold, a larger one occurring at the end of the cell; cilia mottled tawny grey. Exp. al. 16—18 mm. Hindwings and cilia pale greyish cinereous, with a slight tawny gloss. Abdomen ochreous. Legs dirty whitish.

Type ♀ (27712) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895. Seven specimens.

334. (3) *Heterocrossa olivaceonitens*, sp. nov. (Pl. XII. fig. 13).

Antennae greyish, basal joint olive-grey, with a fuscous shade on the first joints adjacent to it. Palpi (♀) very long, porrect, extending more than three times the length of the head beyond it; olive-grey, mixed with a few blackish scales, a blackish shade upon the upper side of the terminal joint. Head and Thorax olive-grey. Forewings rich, shining, olive-green, with four transverse lines of raised scale-tufts, black tipped with ochreous; the first at the base, the fourth at about two-thirds, all running obliquely inward from the costa nearly parallel to the oblique termen; some ochreous spots along the extreme costa alternate with somewhat wider blackish spaces, and an irregular band of five or six blackish dentate marks passes across the wing to the tornus, preceding the narrowly blackish termen; cilia tawny grey. Exp. al. 23—26 mm. Hindwings pale tawny greyish; cilia with a slight ochreous tinge. Abdomen greyish, anal tuft ochreous. Legs whitish cinereous, with transverse bands of olive-grey above.

Type ♀ (26927); ♂ (27050) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., V., VI. 1894, X. 1895. Three specimens.

Hindwings with cubitus pectinate in both sexes.

335. (4) *Heterocrossa subolivacea*, sp. nov. (Pl. XII. fig. 14).

Antennae whitish, faintly banded above; basal joint white, with a dark band on the joints adjacent to it. Palpi (♀) projecting more than twice the length of the head beyond it; white, strongly shaded with dark fuscous beneath the median joint and around the base of the terminal joint. Head white. Thorax greenish, smeared with brown and dark fuscous. Forewings very pale olivaceous green, with blackish markings in which is a slight admixture of brownish scales; the markings follow the same general course as in other closely allied species and consist of an oblique basal patch followed by an oblique half-fascia and an equally oblique median band, in this case not quite reaching the fold and consisting of separate costal spots, corresponding with lines of other spots beneath them, more or less blended by a central shade along the cell on which at its outer edge a distinctly raised tuft of whitish scales, with a smaller one beneath it, forms the outer margin of the band, a few slightly raised scales being also noticeable on some of the preceding markings; the sinuate, or almost biangulate, ante-terminal line reaches to the tornus, but does not touch the costal spot above it, the termen itself is also narrowly shaded with black and a small costal spot precedes the rather darkly shaded apical cilia, beneath which the cilia are of a tawny greyish hue, somewhat darker along their basal half, within a slender pale parting line, than on their outer half beyond it. Exp. al. 16—18 mm. Hindwings pale grey, with a slight tawny tinge; cilia pale tawny cinereous. Abdomen and Legs pale cinereous; hind tarsi banded above with fuscous.

Type ♀ (26480); ♂ (26483) Mus. Wlsm.

HAB. LANAI: 2000 ft., VII. 1894. Three specimens.

Hindwings with the cubitus pectinate in both sexes.

336. (5) *Heterocrossa viridis*, sp. nov. (Pl. XII. fig. 15).

Antennae pale cinereous beneath, smeared and faintly banded with fuscous above; basal joint hoary. Palpi (♀) porrect, stretching three times the length of the head beyond it; hoary, with a slight greenish tinge, the terminal joint and the under side of the median joint blackish. Head hoary, with a faint greenish tinge. Thorax pale olivaceous grey, the tegulae with a black central spot. Forewings very pale olive-green, rather shining; with an oblique black basal patch, broad on the costa narrow on the dorsum; a broken black fascia running parallel with it at one-third from the costa to the fold; two similar broken fasciae, also parallel, about the middle of the wing, with a small black costal dot between them; these are joined by a blackish shade, on the middle of the cell, and both contain one or two patches of slightly raised scales tipped with whitish ochreous; beyond these is a sinuate black band from costa to tornus, scarcely oblique, its upper extremity forming one of a series of black costal spots which mark the commencement of each transverse band, the spaces between them being almost whitish; a single costal spot lies before the apex and the termen is also spotted with black; cilia tawny grey. Exp. al. 22 mm. Hindwings pale tawny grey; cilia pale cinereous. Abdomen tawny grey. Legs cinereous, banded with tawny grey.

Type ♀ (27259) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., VI. 1894. Unique.

337. (6) *Heterocrossa nigronotata*, sp. nov. (Pl. XII. fig. 16).

Antennae fuscous, the basal joint dirty greenish white. Palpi (♀) extending more than twice the length of the head beyond it; greenish white, the median joint speckled above and shaded beneath and at the base with fuscous, the terminal joint annulate with fuscous before the apex. Head greenish white. Thorax greenish grey. Forewings pale green, a number of fuscous patches and spots, some consisting of raised scales, are distributed about the wing-surface; first a series of more or less triangular fuscous patches extends along the costa; the first at the base forming a basal patch reaching to the dorsum, its outer edge sloping obliquely inwards; a second, at one-third, is rather smaller and the four others, continuing nearly to the apex, diminish gradually in size, a small costal spot intervening between the third and fourth from the base; these, more or less connected with a large reduplicated fuscous patch at the end of the cell, may be regarded as forming a broken triangular patch extending to the fold, below which are some fuscous scales on the dorsum; this patch is preceded by a reniform fuscous spot on the upper edge of the fold and followed by an irregular line of broken fuscous spots, half-way to the termen, joining about the tornus a fuscous terminal line, broken into spots at its lower extremity; another fuscous spot lies below the fold at a little less than one-third from the base; cilia mottled tawny cinereous. Exp. al. 16—20 mm. Hindwings and cilia tawny grey. Abdomen cinereous. Legs whitish, shaded and banded with fuscous.

Type ♀ (28631); ♂ (27478) Mus. Wlsm.

HAB. HAWAII: Olaa, 2000 ft., (1) VI. 1895, (1) VII. 1895, (2) XI. 1896; Mt. Kilauea, (2) VII. 1895. Six specimens.

In the hindwings the cubitus is pectinate in both sexes.

338. (7) *Heterocrossa crinifera*, sp. nov. (Pl. XII. fig. 17).

Antennae dirty whitish. Palpi (♂) reaching the length of the head beyond it; (♀) stretching twice the length of the head beyond it; white, median joint blackish externally to half its length and at the base of the terminal joint. Head white. Thorax greenish, mottled with pale ferruginous and brownish fuscous. Forewings pale grass-green, the markings, which are all brownish fuscous, consist of a short oblique basal patch with an elongate costal spot beyond it, a minute dot placed obliquely inward beneath it; a central patch of confluent spots, reaching obliquely downward to the fold, but disconnected from three costal spots above it, the outer of which is reduplicated by a short fuscous line beneath it; two other costal spots lie before the apex and some thinly scattered groups of scales indicate a subterminal shade in the direction of the tornus, four or five more or less confluent spots lying along the termen before the somewhat tawny grey cilia; in fine specimens raised scales are to be found on the basal patch and on the median patch above the fold. Exp. al. 14—16 mm. Hindwings pale rosy grey; cilia slightly paler. Abdomen greyish cinereous. Legs whitish with a slight ochreous tinge.

Type ♂ (25163); ♀ (26281) *Molokai*, Mus. Wlsm.

HAB. OAHU: Waianae Mts., (2) IV. 1892.—MOLOKAI: above 3000 ft., (2) 12—24. VI. 1893. Four specimens.

Described from Molokai specimens, those from Oahu are not in good condition but they appear to belong to the same species. The cubitus of the hindwings is pectinate in both sexes.

339. (8) *Heterocrossa herbarum*, sp. nov. (Pl. XII. fig. 18).

Antennae whitish cinereous, faintly banded above towards the base; basal joint whitish. Palpi (♀) extending three times the length of the head beyond it; white, with a brown shade beneath the median joint and around the base of the terminal joint. Head white. Thorax white, with a slight greenish tinge, and with a brown shade on the tegulae. Forewings very pale grass-green, with a brownish basal patch, broader on the costa than on the dorsum; two large brownish costal patches, one before and one about the middle, the first reaching nearly to the lower edge of the cell, the second somewhat shorter, both narrowly margined with whitish around their lower extremities; these are followed by four smaller costal spots of the same colour, the outer one a little before the apex, the intermediate costal spaces narrowly whitish; at the end of the cell is an obliquely placed reniform brown blotch, narrowly pale-margined, and preceded by a smaller spot above the middle of the fold (also pale-margined), a short curved streak lying below the fold nearer to the base; a faint sinuate brownish shade precedes the termen which is narrowly blotched with brown throughout, some small groups of brown scales at the tornus and on the dorsum before it; cilia whitish cinereous, faintly tesselated with brown. Exp. al. 21 mm. Hindwings and cilia white, with a faint rosy grey tinge. Abdomen and Legs pale brownish ochreous.

Type ♀ (26477) Mus. Wlsm.

HAB. LANAI: 2000 ft., VII. 1894. Unique.

In markings and tone of colour this species most resembles *graminis*, it can be separated by the second costal spot (beyond the basal patch) being large, somewhat triangular and not reduplicated; in *graminis* the second costal spot is broken up into two spots, the lower, reniform in shape, being the larger. *H. herbarum* and *subolivacea* are both from Lanai, in the former the second costal spot points outward while in the latter this spot is smaller, blacker and pointed inwards—the tone of green is quite different in these two species.

340. (9) *Heterocrossa graminis*, sp. nov. (Pl. XII. fig. 19).

Antennae whitish, a small grey spot above, adjacent to the clear white basal joint. Palpi (♀) stretching more than three times the length of the head beyond it; white, with a slight greenish tinge at the sides, smeared with olive-brown beneath the basal half of the median joint and on the upper side of the terminal joint. Head white. Thorax whitish, with a faint greenish tinge and one or two pale olive-brown spots on its anterior margin. Forewings pale grass-green, with olive-brown blotches and spots arranged in broken transverse lines, obliquely parallel with the termen; the first at the base, the others corresponding to four costal spots (in the central portion of the wing more or less blended together) of which the first only reaches below the fold; some of the larger blotches, of which these lines are composed, have a slight cupreous gloss; the subterminal shade does not reach the costa and is not quite so oblique as the termen itself, along which runs a delicate grey shade, reduplicated in the greenish cilia. Exp. al. 15—21 mm. Hindwings and cilia white, with a slight rosy grey tinge. Abdomen and Legs pale brownish ochreous.

Type ♀ (26839); ♂ (27047) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (12) IV. 1895; Halemanu, 4000 ft., (1) V. 1895; Mts., 3000—4000 ft., (5) V. 1894, (10) VI. 1894. Twenty-eight specimens.

In the hindwings the cubitus is pectinate in both sexes.

This species differs from *herbarum* in having the second costal spot (beyond the basal patch) broken into two spots.

341. (10) *Heterocrossa tincta*, sp. nov. (Pl. XII. fig. 20).

Antennae cinereous, the basal joint white. Palpi (♀) projecting three times the length of the head beyond it; cinereous externally, whiter on their inner sides, the median joint shaded with brownish ferruginous at its base; the terminal joint brownish ferruginous, except at its apex. Head white. Thorax cinereous, with a greenish tinge. Forewings pale green, with a faintly indicated short basal patch, wider on the costa than on the dorsum; a series of six costal spots, a narrow broken terminal shade, and a small dorsal patch at one-third, all dull brownish grey; in addition to these markings an elongate blackish patch occupies the outer end of the cell, its outer extremity marked by raised creamy whitish scales, two smaller elongate spots of the same colour lie between it and the costa beneath the first and fourth costal spots respectively; beyond the latter is a sinuate line of about seven black scale-spots reaching to the tornus; there is an indication of one or two small dark scale-spots about the middle of the fold, the basal patch and dorsal spot both having raised scales at their outer edge; the spaces between the costal spots are creamy whitish; cilia rosy brownish grey. Exp. al. 18—21 mm Hindwings pale rosy grey; cilia very pale ochreous. Abdomen pale greyish cinereous. Legs whitish ochreous.

Type ♀ (28041) *Hawaii*, Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (2) IV. 1895.—LANAI: above 2000 ft., (1) I. 1894.—HAWAII: Olaa, (1) IX. 1896. Four specimens.

The specimens from Kauai and Lanai are whitish rather than green, in the specimen from Hawaii the ground-colour is distinctly bright grass-green—this is probably the normal colouration, the other specimens being bleached.

The cubitus of the hindwing is pectinate in both sexes.

342. (11) *Heterocrossa gemmata*, sp. nov. (Pl. XII. fig. 21).

Antennae pale cinereous; the basal joint fuscous above. Palpi (♀) extending more than three times the length of the head beyond it; fuscous, tipped with pale cinereous, a few raised brownish scales above the base of the median joint. Head and Thorax brownish fuscous. Forewings brownish fuscous, mixed with dark fuscous and brilliant metallic emerald-green; at the base of the costa is a dark fuscous patch, with two dark basal spots below it, accompanied by raised scale-tufts of the paler ground-colour; this is followed at regular intervals by six smaller dark costal patches, and these are less distinctly repeated around the termen; on the outer half of the cell is an irregular reniform dark fuscous patch, its concave margin turned towards the costa and narrowly bordered by bright emerald-green scales which partially connect two irregular streaky patches of bright emerald-green, the one before it about the middle of the cell, the other beyond it, extending half-way between the cell and the termen; the first of these patches is accompanied by three tufts of raised scales, in which some pale cinereous is mixed, and the second has also at its base a large reduplicated tuft of raised scales of the dark fuscous ground-colour; cilia pale brownish fuscous. Exp. al. 17—25 mm. Hindwings pale brownish grey, with a slight iridescence; cilia brownish cinereous. Abdomen and Legs pale brownish cinereous; the latter banded above with brownish fuscous.

Type ♀ (28628) Mus. Wlsm.

HAB. HAWAII: Olaa, (1) IX. 1896; Olaa, 2000 ft., (5) XI. 1896. Six specimens.

343. (12) *Heterocrossa subumbrata*, sp. nov. (Pl. XII. fig. 22).

Antennae (♂) with very long cilia; pale fawn brownish, a small dark spot above adjacent to the basal joint. Palpi (♂) rather slender, projecting more than the length of the head beyond it; fawn brownish, slightly shaded beneath the median and around the terminal joint. Head and Thorax fawn-brown. Forewings fawn-brown, sprinkled with pale cinereous, the spaces, between the series of slightly darker costal spots and a sinuate line along the outer margin of the cell, reaching to the dorsum, obscurely pale cinereous; a slightly darker brown shade, running along the cell, is repeated at the base of the wing in the direction of the costa; beyond the end of the cell the apical and terminal portion of the wing is suffused with greyish fuscous on which a sinuous subterminal shade and a narrow terminal shade appear of a still darker tint; cilia brownish fuscous, slightly mottled. Exp. al. 15 mm. Hindwings tawny grey; cilia pale greyish cinereous. Abdomen brownish grey, anal tuft inclining to ochreous. Legs pale brownish ochreous.

Type ♂ (25092) Mus. Wlsm.

HAB. OAHU: Waianae Mts., IV. 1892. Unique.

In the hindwings the cubitus is pectinate in the ♂.

344. (13) *Heterocrossa bicincta*, sp. nov. (Pl. XII. fig. 23).

Antennae leaden grey. Palpi (♀) extending more than twice the length of the head beyond it; leaden grey. Head dull leaden grey. Thorax shining, leaden grey. Forewings shining, leaden grey, mixed with some dark olive-grey, especially along the costa to the middle and about some patches of slightly raised scales on the basal half; one of these, at the upper edge of the fold beyond its middle, has a slight ochreous tinge at the tips of the scales; there is also a somewhat thickened patch of shining grey at the end of the cell, beyond which are two curved dark olive-grey bands, one around the apex and termen, the other preceding it and separated from it by a parallel curve of shining leaden grey; on the costa beyond the middle are a few small whitish spots, a series of very small ones extending around the apex and termen at the base of the rather tawny grey cilia. Exp. al. 12—15 mm. Hindwings leaden grey; cilia scarcely paler. Abdomen brownish cinereous. Legs grey, with faint paler tarsal specks.

Type ♀ (26391) Mus. Wlsm.

HAB. MOLOKAI: about 4500 ft., 23. IX. 1893. Three specimens.

345. (14) *Heterocrossa dispar*, sp. nov. (Pl. XII. fig. 24).

Antennae whitish, with an ochreous tinge. Palpi (♀) projecting twice the length of the head beyond it; white on their inner sides, brownish grey externally. Head and Thorax whitish. Forewings brownish grey, sprinkled with white, the extreme base of the wing below the costa is whitish, with some raised scales, and these are succeeded by smaller patches of slightly raised white scales; one below the fold, one on the middle of the fold, and one beyond it about the lower angle of the cell; the plical spot is sometimes diffused upwards and inwards towards the costa, where there is a narrow white streak along the extreme margin, a little before the middle; half-way between this and the apex an outwardly oblique white band, narrowly reduplicated, on its outer side curving parallel with the margin, becomes evanescent before the tornus; cilia brownish grey, with a broken whitish line along their base. Exp. al. ♂ 9—10 mm.; ♀ 13 mm. Hindwings pale brownish cinereous. Abdomen brownish cinereous. Legs whitish.

Type ♀ (25678); ♂ (25577) Mus. Wlsm.

HAB. HAWAII: Kaawaloa (Kona), 1500—above 2000 ft., (3) IX. 1892; Kona, above 2000 ft., (2) IX. 1892. Five specimens.

In the hindwings the cubitus is pectinate in both sexes.

The ♂ is distinctly smaller than the ♀, the markings being less distinct, the white spots having a tendency to obliteration.

346. (15) *Heterocrossa pygmaeella*, sp. nov.

Antennae fuscous, basal joint pale cinereous. Palpi cinereous. Head pale cinereous. Thorax brownish olivaceous fuscous. Forewings brownish olivaceous fuscous, a faint indication of a costal shade-spot at one-third and an oblique transverse fascia from the costa at two-thirds running inward to the dorsum; owing to a fine sprinkling of cinereous scales the wing-surface, especially towards the apex, has a slightly mottled appearance; cilia brownish fuscous. Exp. al. 7 mm. Hindwings and cilia fuscous. Abdomen and Legs fuscous.

Type ♂ (25400) Mus. Wlsm.

Hab. Hawaii: Kona, 3000 ft., ix. 1892. Two specimens.

A very small inconspicuous species, with scarcely any indication of markings on the wings, it is easily distinguished from all the other species by its puny dimensions.

347. (16) *Heterocrossa latifasciata*, sp. nov. (Pl. XII. fig. 25).

Antennae tawny grey, basal joint white. Palpi (♀) porrect, projecting three times the length of the head beyond it; white, with a dark tawny grey shade along the under side of the median joint, especially on its basal half, and a fainter shade around the base of the terminal joint. Head and Thorax white; the latter shaded with tawny grey posteriorly. Forewings tawny grey, with shades of dark tawny fuscous, especially along the cell from the base and along the termen and apex, leaving a broad white fascia just beyond the end of the cell, rather less oblique than the termen itself, with which it is nearly parallel; along the costa is a series of rich tawny spots, alternating with white, and on the dark basal portion of the wing are patches of slightly raised dark tawny scales above and below; at the end of the cell a slender curved streak from the white fascia forms a semi-detached ear-shaped spot; cilia pale tawny grey. Exp. al. 18 mm. Hindwings and cilia pale tawny greyish. Abdomen tawny greyish. Hind Legs whitish, the tarsi shaded with tawny grey.

Type ♀ (25352) Mus. Wlsm.

Hab. Hawaii: Kona, 3500 ft., 29. vi. 1892. Unique.

348. (17) *Heterocrossa corticella*, sp. nov. (Pl. XII. figs. 26—28).

348^a. (17^a) *corticella*, Wlsm. + *semitogata*, var. nov. (Pl. XII. fig. 26).

Antennae bone-whitish, the basal joint suffused with brownish fuscous above. Palpi bone-whitish, shaded beneath the median joint and around the terminal joint with dark brownish fuscous. Head and Thorax bone-white. Forewings bone-white, with a short basal patch consisting of raised tufts of bone-white scales, sprinkled towards the costa with brownish fuscous; beyond this is a large dark brownish fuscous patch extending along two-thirds of the dorsum, but along rather less than half the costa, throwing out an acute angle from its middle to the upper extremity of the cell, in this patch is also some indication of raised scale-tufts mixed with whitish scales; on either side of the fold, along its outer edge, runs a rather narrow band of the pale ground-colour, not sprinkled with darker scales except at the costa, but beyond this the remainder of the wing to the apex and termen is sparsely sprinkled with dark fuscous and rust-brown scales, which form on the costa five faint marginal spots with a slightly darker one between the second of these and the outer angle of the large dark patch; cilia dull greyish, speckled with bone-white. Exp. al. 16—19 mm. Hindwings pale bluish grey, the cilia with a slight ochreous tinge. Abdomen and Legs pale whitish ochreous.

Type ♀ (27228); ♂ (27323) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (2) IV. 1895; Mts., 3000—4000 ft., (1) V. 1894, (2) VI. 1894. Five specimens.

348^{b}. (17^{b}) *corticella*, Wlsm. + *piperatella*, nov. var. (Pl. XII. fig. 27).

Antennae dirty white, faintly banded above with fuscous towards the base, and with a fuscous spot above, adjacent to the basal joint. Palpi (♂) projecting not more than the length of the head beyond it; (♀) projecting twice the length of the head beyond it; dirty white, sprinkled with fuscous externally, and deeply shaded with fuscous beneath the median joint and around the base of the terminal joint. Head hoary white. Thorax whitish, shaded with brownish grey. Forewings white, with brownish grey and brown markings sprinkled with black scales; a strong black patch along the outer third of the cell, blending with shades of brown and grey, continued to the costa before it and to the dorsum beneath it; the oblique basal patch terminates in a black spot of raised scales at its narrow dorsal extremity, beyond which is a larger brownish dorsal patch, also profusely sprinkled with black scales, some at its upper edge strongly raised and tipped with white; there is a series of six dark costal spots, the space between and below them richly speckled with black and brown scales, which are also continued in a narrow anteterminal line to the tornus; four brownish sprinkled spots lie along the termen, almost at the base of the dusky greyish cilia, which are sprinkled with white at intervals. Exp. al. (♂) 16—22 (♀) mm. Hindwings and cilia bone-whitish. Abdomen and Legs bone-whitish.

Type ♀ (27206); ♂ (27676) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (11) IV. 1895; Mts., 3000—4000 ft., (4) VI. 1894. Fifteen specimens.

348^c. (17^c) *corticella*, sp. nov. + *corticella*, var. nov. (Pl. XII. fig. 28).

Antennae (♂) biciliate 5; dusky cinereous, with a black spot above adjacent to the basal joint. Palpi (♂) short, projecting not more than the length of the head beyond it; dusky cinereous, minutely speckled externally and across the upper side of the terminal joint with fuscous. Head and Thorax dusky cinereous; the latter shaded across its anterior margin with brownish olive. Forewings cinereous, profusely sprinkled with rather shining, olivaceous greenish scales between the darker markings, which consist of a short oblique basal patch, a series of six costal spots (of which two, about the middle, are smaller than the others) and a broken diffused median shade—all brownish olivaceous; there are several patches of raised scales on the median shade, and between this and the base these are rendered more conspicuous by streaks of dark fuscous running along them, their outer edges inclining to pale ochreous; a few short dark fuscous streaks also accompany the veins around the upper angle of the cell; along the termen is a brownish olivaceous shade, showing some tendency to be broken up into spots; cilia greyish cinereous, their basal half dark tawny grey. Exp. al. 15—20 mm. Hindwings pale grey, with a faint rosy iridescence in a strong light; cilia very pale cinereous. Abdomen brownish grey; anal tuft pale ochreous. Legs whitish ochreous.

Type ♂ (26838) *Kauai*, Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (11) IV. 1895; Mts., 3000—4000 ft., (2) VI. 1894.—OAHU: Waianae Mts., 2000—3000 ft., (1) IV. 1892.—MOLOKAI: above 4500 ft., (1) 11. IX. 1893. Fifteen specimens, all males.

Hindwings with the cubitus pectinate in the male.

This is a very variable species; *latifasciata* (from Hawaii) is somewhat similar to var. *semitogata* but is more suffused with dark tawny fuscous. It would be unsafe to consider it an extreme form of *corticella* on the evidence of a single specimen.

349. (18) *Heterocrossa ferruginea*, sp. nov. (Pl. XIII. fig. 1).

Antennae (♂) biciliate 5; cinereous, faintly banded above near the base; basal joint greyish fuscous above. Palpi whitish ochreous, shaded beneath the median joint. Head whitish ochreous. Thorax greyish fuscous, mottled with whitish ochreous and pale ferruginous. Forewings brownish ochreous, tending to whitish ochreous around the margins and on a pale costal spot at one-fourth; the short oblique basal patch and a broad oblique median shade consist of a mixture of ferruginous and greyish fuscous scaling, almost obliterating the paler ground-colour, except along the dorsum; the greyish fuscous tint is most noticeable in a series of costal spots, four of which are connected with the median shade, two others lie before the apex and a series of smaller ones around the termen; connected with the median shade and basal patch are some groups of raised scales, sprinkled with dark fuscous (almost black) and tipped with whitish;

these are especially noticeable at the outer extremity of the basal patch near the costa, on either side of the fold before its middle, and at the outer edge of the median band about the lower angle of the cell; some dark fuscous sprinkling also occurs in a faint subterminal band; cilia greyish, tesselated with darker shade-spots, separated by whitish ochreous along their basal half. Exp. al. 16—18 mm. Hindwings pale bluish grey; cilia with a faint ochreous tinge. Abdomen pale cinereous, anal tuft whitish ochreous. Legs whitish ochreous, faintly banded with grey.

Type ♂ (26393) Mus. Wlsm.

HAB. MOLOKAI: about 4000 ft., (1) 9. VI. 1893; about 5000 ft., (1) 13. IX. 1893. Two specimens.

350. (19) *Heterocrossa togata*, sp. nov. (Pl. XIII. fig. 2).

Antennae white, faintly banded above towards the base. Palpi (♀) extending more than the length of the head beyond it; creamy white, the median joint shaded at the base beneath and the terminal joint around its base with brownish fuscous. Head and Thorax creamy white, the latter shaded with brownish fuscous. Forewings creamy white, shaded with brownish fuscous, a large patch of this colour, mixed with a few ferruginous scales, extends from the base over two-thirds of the wing-length, broken only by the pale ground-colour in an ill-defined, wedge-shaped, oblique costal patch at about one-third; the outer edge of the dark shade is slightly indented between the fold and the lower angle of the cell, beyond which a slight subterminal shade of mixed brownish fuscous and ferruginous scales runs to the tornus, but does not attain the costa; two or three small marginal spots are visible around the apex; cilia creamy white, faintly mottled with greyish. Exp. al. 14—18 mm. Hindwings very pale bluish grey; cilia with a slight creamy tint. Abdomen and Legs very pale whitish ochreous.

Type ♀ (26681); ♂ (28195) Mus. Wlsm.

HAB. MAUI: Haleakala, above 5000 ft., (1) III. 1894; Olinda (Haleakala), (1) IV. 1894, (1) V. 1896; Haleakala, 4000 ft., (1) 5000 ft., (17) V. 1896, 5000 ft., (20) X. 1896. Forty-one specimens.

In the hindwings the cubitus is pectinate in both sexes.

A variable species, in some forms the darker colour suffuses the wing for two-thirds from the base.

351. (20) *Heterocrossa divaricata*, sp. nov. (Pl. XIII. fig. 3).

Antennae (♂) with very long cilia; greyish olivaceous, the basal joint and that adjacent to it banded above with fuscous. Palpi greyish olivaceous; the median joint umber-brown externally at the base, terminal joint greyish fuscous, except at its apex.

Head and Thorax greyish olivaceous; the latter sprinkled with fuscous. Forewings pale olivaceous greyish, the markings dark chestnut-brown, mixed and sprinkled with black; these consist of an oblique basal patch, six costal spots (the first four of which form part of a large median triangular blotch, its apex reaching to the dorsum, much broken and interrupted on its upper half by the pale ground-colour) and a terminal and subterminal shade, almost blended at the tornus where they are broken into spots; cilia pale olivaceous grey. Exp. al. 12—16 mm. Hindwings very pale bluish grey, the cilia with a faint ochreous tinge. Abdomen stone-ochreous. Legs pale cinereous; the hind tibiae and first tarsal joints banded with fuscous.

Type ♂ (27040); ♀ (27152) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (30) IV. 1895; Mts., 3000—4000 ft., (3) V. 1894, (18) VI. 1894; Lihue, 4000 ft., (1) VII. 1896; Mts., 3000—4000 ft., (1) X. 1895. Fifty-three specimens.

In the hindwings the cubitus is pectinate in both sexes.

352. (21) *Heterocrossa nigromaculata*, sp. nov. (Pl. XIII. fig. 4).

Antennae and Palpi pale ochreous; the latter slightly shaded beneath and on the terminal joint. Head and Thorax pale ochreous; the latter sprinkled with chestnut-brown posteriorly. Forewings pale ochreous, with a broad median shade, running obliquely inwards, from costa to dorsum, and consisting of patches of chestnut-brown, mixed with blackish scales, having a tesselated or mottled appearance, caused by the intrusion of the pale ground-colour between them, especially about the fold and at the upper edge of the cell; about the middle of the wing, forming the central part of the median shade, is an elongate black patch around which some of the scales are slightly raised; a subterminal shade of chestnut-brown, mixed with blackish scales, reaches the tornus, and there is a faint indication of a few brownish dots around the apex and termen at the base of the pale ochreous cilia. Exp. al. 10—15 mm. Hindwings pale leaden grey, with a slight rufous tinge; cilia pale cinereous. Abdomen greyish ochreous. Legs whitish ochreous.

Type ♀ (25147); ♂ (25148) Mus. Wlsm.

HAB. OAHU: Waianae Mts., 2000 ft., and upwards, IV. 1892. Nine specimens, on tree-trunks.

In the hindwings the cubitus is pectinate in both sexes.

353. (22) *Heterocrossa distincta*, sp. nov. (Pl. XIII. fig. 5).

Antennae cinereous, basal joint whitish ochreous, with a small black spot adjacent to it above. Palpi (♀) projecting about twice the length of the head beyond it; whitish ochreous, the median joint strongly marked with black at its base beneath, terminal joint with a fuscous band around its base. Head and Thorax whitish ochreous; the latter tinged with brownish ochreous across the middle. Forewings shining, whitish ochreous; a short basal patch running obliquely inwards from the costa is pale brownish ochreous, except on the costal margin which is black, it contains one or more patches of raised scales; beyond it is a costal spot at one-third, consisting of two lines of black (one costal, the other subcostal) running through brownish ochreous; a minute black dot of raised scales lies beneath its lower extremity, a similar but somewhat larger spot of raised brownish ochreous scales a little nearer to the base below the fold; four or five blackish costal spots form a series reaching nearly to the apex, the first very minute and reduplicated below the costa; a broad, somewhat triangular, central patch of black, outwardly edged with raised brownish ochreous scales, occupies the outer end of the cell, with two minute black dots set in brownish ochreous on the fold beneath it; a few black dots, set in brownish ochreous, faintly indicate a subterminal shade, and the narrowly brownish ochreous termen contains a series of four or five black spots at the base of the rather tawny grey cilia. Exp. al. 16 mm. Hindwings very pale, shining, leaden grey; cilia slightly paler. Abdomen pale bone-ochreous. Legs whitish ochreous, with faint darker bands on the hind tarsi and tibiae.

Type ♀ (27126) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (1) V., (1) VI. 1894. Two specimens.

The markings on the forewings of this species are much more distinct, through being more clearly separated from each other, than in the majority of species of this genus. In the paratype the ground-colour is tinged throughout with pale brownish.

354. (23) *Heterocrossa cervinella*, sp. nov. (Pl. XIII. fig. 6).

Antennae cinereous, faintly banded above towards the base. Palpi fawn-brown, faintly sprinkled with fuscous beneath and externally, brownish cinereous on their inner sides. Head and Thorax brownish cinereous; the tegulae fawn-brown sprinkled with fuscous. Forewings pale fawn-brownish, mottled with darker fawn-brown on their basal half, in a curved subterminal shade, and in a series of apical and terminal spots; the costal spots are slightly tinged with fuscous; on the cell, occupying the median portion of the wing, are two greenish whitish reniform patches, more or less connected along the cell, and sprinkled around their edges with blackish scales; cilia pale fawn-brownish, mottled with a darker shade along their basal half. Exp. al. (♂) 10—18 (♀) mm. Hindwings pale leaden grey, the cilia with a slight brownish ochreous tinge. Abdomen pale leaden grey. Legs pale brownish ochreous; the hind tarsi faintly shaded above.

Type ♂ (27686); ♀ (27726) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (1) V. 1894, (4) VI. 1894; Kaholuamano, 4000 ft., (21) IV. 1895. Twenty-six specimens.

Hindwings with the cubitus pectinate in both sexes.

355. (24) *Heterocrossa mauii*, sp. nov. (Pl. XIII. fig. 7).

Antennae cinereous. Palpi whitish on their inner sides, externally sprinkled with brownish fuscous, the terminal joint ringed with the same. Head white. Thorax brown. Forewings rather shining, white, with the usual short, obliquely outer-margined, basal patch, brown with some raised fuscous scales; a large mottled costal triangle, also brown, with raised fuscous scales on the disc at its outer edge; its inner and outer margins also mixed with fuscous about the costa; a semi-detached spot on the upper edge of the fold precedes its lower extremity, a triangular dorsal patch at one-third, and a small dorsal spot a little beyond the apex of the costal triangle are also brown, with some admixture of raised fuscous scales; around the apex and termen a series of fuscous spots, more or less connected by brown scaling, is preceded by a broken transverse line arising from the tornus; cilia pale cinereous, faintly mottled with greyish fuscous. Exp. al. 13—15 mm. Hindwings and cilia shining, pale greyish. Abdomen greyish cinereous. Hind Legs fuscous externally, with whitish bands across the tarsal joints.

Type ♀ (28198); ♂ (28192) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., (1) 2. IV. 1894, (2) V. 1896. Three specimens.

The cubitus of the hindwings is pectinate in both sexes.

356. (25) *Heterocrossa irrorata*, sp. nov. (Pl. XIII. fig. 8).

Antennae bone-whitish. Palpi bone-whitish above, brownish fuscous beneath. Head and Thorax bone-white; tegulae with a black spot at their base and a brownish shade beyond. Forewings bone-white, with a slight ochreous tinge; a ferruginous basal patch, incised at its outer edge in the fold, is produced along the dorsum to one-third, and thickly sprinkled throughout with blackish scales; at its lower extremity this is partially connected by a slight ferruginous shade with a triangular costal patch of the same colour, much sprinkled with scales of the pale ground-colour, and containing four small blackish costal spots with a short black streak below the outer one, and emitting from its lower extremity a narrow ferruginous line, mixed with black scales, to the dorsum beyond the middle; the subterminal shade is not strongly expressed, but a series of blackish spots mixed with ferruginous (two costal and five terminal) occurs around the apex and termen, the greyish cilia having on their basal third a tesselated appearance from shades of darker grey, corresponding with each of the dark spots, but separated from them along the termen by a slender pale ochreous line. Exp. al. 14 mm. Hindwings almost white, but with a faint bluish grey tinge; cilia faintly tinged with ochreous. Abdomen and Legs whitish ochreous.

Type ♂ (26472) Mus. Wlsm.

HAB. LANAI: 3000 ft., (2) I. 1894, 2000 ft., (1) II. 1894, (1) VII. 1894 [(1) XII. 1893 ?]. Five specimens.

Hindwings with the cubitus pectinate in the male.

A denuded female taken in December is probably referable to this species.

357. (26) *Heterocrossa atronotata*, sp. nov. (Pl. XIII. fig. 9).

Antennae greyish fuscous, the basal joint white. Palpi (♀) stretching nearly three times the length of the head beyond it; shining, white, shaded with fuscous beneath, and with a fuscous ring at the base of the terminal joint. Head and Thorax shining, white, the latter with a greyish fuscous shade across the middle and blackish spots at the base of the tegulae. Forewings shining, white, with a black basal patch, wider on the costa than on the dorsum, followed by a triangular black dorsal patch, its apex reaching half-way across the cell; a large black triangular mediocostal patch is interrupted by an outwardly oblique white costal streak about its middle and by white lines cutting off a spot before and a streak beyond its lower extremity; a short black dorsal streak precedes a rather broad straight black subterminal band, narrowed on the costa, but dilated towards the tornus where it is broken into black marginal spots, forming part of a somewhat confluent terminal series extending around the apex to the costa; cilia pale greyish. Exp. al. 20 mm. Hindwings and cilia pale greyish. Abdomen greyish ochreous. Legs pale greyish fuscous, the tarsal joints whitish ochreous.

Type ♀ (26526) Mus. Wlsm.

HAB. MAUI: Haleakala, 10,000 ft., IV. 1894. Unique.

358. (27) *Heterocrossa inscripta*, sp. nov. (Pl. XIII. fig. 10).

Antennae (♂) biciliate 3; pale brownish cinereous. Palpi white, median joint shaded laterally with brownish fuscous. Head and Thorax white; the bases of the tegulae dark brownish fuscous. Forewings rather shining, white, with a brownish fuscous triangular basal patch, wider on the costa than on the dorsum; this is followed by a larger, median, triangular fuscous costal patch, its apex reaching to the fold; this is succeeded by a narrow straight fascia of the same colour, beyond which is a small costal spot before the apex and a series of five more or less connected marginal spots along the termen, reaching to the tornus but not touching the apex; all the markings are very clearly defined; cilia pale brownish cinereous. Exp. al. 13—16 mm. Hindwings and cilia pale brownish cinereous. Abdomen brownish cinereous. Hind Legs whitish, the tarsi faintly shaded above.

Type ♂ (27477); ♀ (27476) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, (2) VII. 1895; Olaa, (1) VII. 1895; Olaa, 2000 ft., (1) XI. 1896. Four specimens.

The cubitus of the hindwings is pectinate in both sexes.

359. (28) *Heterocrossa pusilla*, sp. nov. (Pl. XIII. fig. 11).

Antennae whitish cinereous. Palpi whitish, shaded with greyish fuscous to beyond the middle of the median joint and on the middle of the terminal joint externally. Head white. Thorax shaded with greyish fuscous. Forewings white, with a short greyish fuscous triangular basal patch, its base resting on the base of the dorsum, its apex slightly produced along the costa; a large, ill-defined, greyish fuscous triangular medio-costal patch, mottled with white, reaches to the fold, a small dorsal spot below and a little beyond its apex; a slight fuscous transverse shade, mixed with some brown scales, precedes the apex around which a slender marginal line of the same colour lies at the base of the whitish cilia. Exp. al. 9 mm. Hindwings and cilia shining, greyish white. Abdomen white, with a brownish grey tinge. Legs yellowish white.

Type ♂ (26047) Mus. Wlsm.

HAB. OAHU: Waianae Mts., above 2000 ft., IV. 1892. Two specimens.

360. (29) *Heterocrossa trigononotata*, sp. nov. (Pl. XIII. fig. 12).

Antennae pale mouse-colour, with a dark shade above, adjacent to the pale ochreous basal joint. Palpi (♂) projecting the length of the head beyond it; whitish ochreous, shaded beneath at the base of the median joint with chocolate-brown. Head whitish ochreous. Thorax very pale ochreous, the tegulae shaded with brown. Forewings very pale ochreous, with an oblique chocolate-brown basal patch, edged externally about the fold with raised scales; a triangular chocolate-brown medio-costal patch, interrupted by an oblique streak of the pale ground-colour before its middle, and by two smaller pale costal spots beyond its middle, at its outer edge, on the end of the cell, the chocolate-brown scales are raised and margined with very pale ochreous; nearly the whole wing-surface is more or less sparsely irrorated with ferruginous and chocolate-brown scales, which become confluent in two or three small spots about and above the middle of the fold, in a small dorsal streak beyond the middle, in a very slightly indicated subterminal shade, and in a stronger terminal shade extending around the tornus, but vanishing at the apex; cilia pale ochreous at their base, slightly shaded with grey outwardly, and tesselated with a darker shade of greyish along their basal half. Exp. al. 14—17 mm. Hindwings very pale grey; cilia inclining to ochreous. Abdomen brownish ochreous. Legs whitish ochreous, broadly banded with brownish grey shading.

Type ♂ (26087); ♀ (28707) *Molokai*, Mus. Wlsm.

HAB. MOLOKAI: above 3000 ft., (2) 5. VI. 1893; 3500 ft., (1) 17. VI. 1893; 4000 ft., (5) 9. VI. 1893, (1) VI. 1896, (1) 23. IX. 1893; forest above Pelekunu (2) 21. IX.

1893.—MAUI: Olinda (Haleakala), 4000 ft., (2) V. 1896; Haleakala, 5000 ft., (1) IV. 1896, (4) V. 1896, (7) X. 1896. Twenty-six specimens.

In some specimens the head, palpi and forewings appear to lose the creamy ochreous colour and are almost white, but the markings are precisely similar; in other specimens the chocolate-brown markings become blackish.

361. (30) *Heterocrossa punctulata*, sp. nov. (Pl. XIII. fig. 13).

Antennae pale cinereous. Palpi (♀) projecting scarcely more than the length of the head beyond it; ashy white, the terminal joint darkened at its base and the median joint slightly shaded beneath. Head and Thorax ashy white, the latter slightly sprinkled in the middle with brownish scales. Forewings ashy white, with a series of faint brownish fuscous costal spots and a faint costal shade at the base, beneath this is a spot of blackish raised scales; a similar small spot lies beneath the first costal spot (which is the largest of the series) at one-third, a minute black dot below the middle of the costa and a larger reduplicated spot of raised scales at the end of the cell; on either side of the fold are other raised scale-spots, and a faint brownish fuscous dorsal spot before the tornus precedes a terminal series of five blackish dots before the base of the ashy grey cilia. Exp. al. 17—20 mm. Hindwings very pale greyish, cilia slightly paler. Abdomen ashy grey. Legs whitish.

Type ♀ (26112); ♂ (28710) Mus. Wlsm.

HAB. MOLOKAI: about 4000 ft., (1) 9. VI. 1893; 4000 ft., (1) VI. 1893, (1) VI. 1896; about 4500 ft., (1) 23. IX. 1893. Four specimens.

The cubitus of the hindwings is pectinate in both sexes.

362. (31) *Heterocrossa achroana*, Meyr. (Pl. XIII. fig 14).

Heterocrossa achroana, Meyr., Ent. Mo. Mag. XX. 31—2 (1883)[1].

Antennae (♂) with very long ciliations; pale cinereous. Palpi (♂) extending the length of the head beyond it; greyish cinereous. Head and Thorax whitish, with a slight brownish ochreous tinge. Forewings whitish, much tinged with brownish ochreous, this is slightly concentrated in five or six costal spots commencing at one-third and continuing to the apex, in a small patch (partly raised) beneath the fold at about one-fourth from the base, in a spot (also somewhat raised) at the end of the cell, in a subterminal transverse shade and in a narrow broken shade along the termen; the spot at the end of the cell is more greyish than the other markings, all of which are very obscure, and there are a few raised scales also above the fold near the base; cilia pale brownish grey. Exp. al. 16—18 mm. Hindwings pearly whitish, with a slight ochreous tinge in the cilia. Abdomen shining, pale brownish ochreous. Legs whitish, with slight transverse grey tarsal shading.

Type ♀ Mus. Meyr. [Caenotype ♂ (27415) Mus. Wlsm.]

HAB. HAWAII: Mauna Loa, (2) 4000 ft., (Blackburn)[1]; Mt. Kilauea, (3) VII. 1895, (5) VIII. 1896 (Perkins). Ten specimens.

In some specimens the spot at the end of the cell is more conspicuous and almost fuscous in colour, the other markings being almost entirely obliterated. Mr Meyrick's two specimens are before me, both are females (not male and female) but in a much worn and bleached condition. In the hindwings the cubitus is pectinate in both sexes.

363. (32) *Heterocrossa solutella*, sp. nov. (Pl. XIII. fig. 15).

Antennae drab-white. Palpi cream-white, the basal half of the median joint shaded with fuscous externally, terminal joint annulate with fuscous. Head and Thorax white. Forewings drab-white, with a slight sprinkling of fuscous scales; an elongate brownish patch at the base of the costa is followed by two small costal spots, one before and one behind the middle, forming, together with an elongate fuscous patch on the outer half of the cell, the outline of a large costal triangle; the termen is shaded with brownish fuscous, an indistinct parallel shade-line preceding it; cilia drab-whitish, slightly shaded on their basal half. Exp. al. 11 mm. Hindwings and cilia sericeous white. Abdomen and Legs cream-white.

Type ♀ (27416); ♂ (27475) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, (5) VII. 1895, (2) VIII. 1895; Kona, 2000 ft., (1) IX. 1892, 3000 ft., (3) IX. 1892; Kaawaloa (Kona), above 2000 ft., (1) IX. 1892. Twelve specimens.

In some varieties the apex of the costal triangle is indicated by a somewhat more developed fuscous shade-spot on the outer end of the cell, and in others this spot is divided into two smaller ones placed one above the other.

364. (33) *Heterocrossa gracillima*, sp. nov. (Pl. XIII. fig. 16).

Antennae pale greyish fuscous. Palpi (♀) projecting scarcely more than the length of the head beyond it; ashy white, shaded with greyish fuscous externally throughout their length, the terminal joint banded with greyish fuscous. Head and Thorax ashy white. Forewings ashy whitish, slightly paler towards the costa along which runs a very narrow shade of pale greyish fuscous, in which a series of darker costal spots is faintly visible; there is a minute spot at the end of the cell and a series of five blackish terminal dots before the base of the very long pale greyish fuscous cilia which are delicately dusted with ashy white. Exp. al. 10—14 mm. Hindwings very pale grey; cilia pale cinereous. Abdomen brownish ochreous. Legs whitish, the tarsi faintly banded with pale greyish ochreous.

Type ♀ (26556) *Maui*, Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (5) IV. 1895; Mts., 3000—4000 ft., (4) VI. 1894.—MOLOKAI: 3000 ft., (1) VI. 1893.—MAUI: Haleakala, 5000 ft., (2) III. 1894; below 4000 ft., (1) V. 1896.—HAWAII: Kona, 4000 ft., (2) 4—17. VIII. 1892. Fifteen specimens.

In some specimens a blackish dot is visible at the end of the cell and another before it slightly above the fold; other minute dots are occasionally present.

V. TORTRICIDAE.

I. OLETHREUTINAE.

37. ECCOPTOCERA, gen. nov.

(ἐκκόπτω = I cut; κέρας = a horn.)

Type *Steganoptycha foetorivorans*, Btl.

Antennae (♂) with an excised notch above beyond the basal joint; very shortly biciliate. Palpi extending fully the length of the head beyond it, somewhat roughly clothed; terminal joint smooth, porrect. Head slightly roughened above and in front. Thorax smooth. Forewings with the costa slightly arched, apex depressed, termen sinuate, slightly oblique; ♂ with a strong costal fold extending fully to the middle: neuration 11 veins (vein 6 obsolete); 7 and 8 stalked, 7 to termen; 3 and 4 strongly bent up towards the termen; 2 much bent. Hindwings broader than the forewings, slightly sinuate below the apex; with a narrow fold along the limbus beneath, making the flexus very distinct and prominent: neuration 7 veins; 3 and 4 coincident; 5 and (3 + 4) connate; 6 and 7 stalked. Legs, hind tibiae with densely packed closely appressed scales above.

Eccoptocera comes nearest to *Holocola*, Meyr., but is distinguished by its notched antennae; *Heligmocera*, Wlsm., differs in the antennae having a sinuation extending over several joints, instead of a notch, and veins 3 and 4 of the hindwings are stalked. *Strepsicrates*, Meyr., has a notch in the antennae, but it is at about one-fifth from the base, and veins 7 and 8 of the forewings are separate. *Bathrotoma*, Meyr., has a notch immediately above the basal joint of the antennae, but veins 7 and 8 of the forewings are separate. *Proteopteryx*, Wlsm., differs in not having the antennae notched, in having veins 7 and 8 of the forewings separate and 3 and 4 of the hindwings stalked. All these genera have twelve veins in the forewings and possess costal folds in the ♂, others belonging to this group, e.g. *Palaeobia*, Meyr., are easily separable from the genera mentioned by the absence of the costal fold.

The only allied genus which agrees with *Eccoptocera* in having only eleven veins in the forewings, a costal fold and notched antennae, is *Hendecasticha*, Meyr., but while *Eccoptocera* has 7 and 8 stalked and 6 obsolete *Hendecasticha* has 7 and 8 coincident—and therefore no stalked apical veins.

The coincidence of veins 3 and 4 of the hindwings (an unreliable character among the species of these genera) appears to be maintained throughout the long series of Hawaiian specimens.

365. (1) *Eccoptocera foetorivorans*, Btl. (Pl. X. figs. 12—14).

Steganoptycha foetorivorans, Btl., Ann. & Mag. NH. (5. s.) VII. 394—5, No. 27 (1881)[1].

Antennae stone-grey, varying to greyish fuscous of a paler or darker shade. Palpi varying from cinereous to fuscous. Head stone-grey, cinereous or dark fuscous. Thorax greyish fuscous, sometimes stone-grey. Forewings whitish cinereous, speckled with tawny fuscous, a dark tawny fuscous median streak runs from the middle of the base to the apex, covering the first half of the fold, and thence diverted upward sending a projecting angle to the costa before its middle and extending along the upper edge of the cell and beyond it in the same line nearly to the apex (this is sometimes broken up, either before or beyond the middle, or in both places, leaving, especially in some of the darker varieties, a short dorso-basal patch, a larger median patch attaining to the middle of the costa, and an antetornal dorsal patch more or less connected with the apical shading: in three specimens, of which a pair were taken *in cop.*, the darker markings become almost entirely obliterated, with the exception of the sinuate terminal shade, the dividing lines between the costal streaks, a faint antetornal patch, and a still fainter median shade); on the base of the costa is a strong fold extending nearly to the middle, and beyond the middle are eight short whitish costal streaks in four pairs, varying in definition and distinctness but always traceable; a narrow tawny fuscous shade descends from the apex along the upper half of the sinuate termen; cilia whitish cinereous, shaded with tawny fuscous at the apex and along their outer half (in the darker forms becoming entirely suffused with fuscous, and in the paler ones almost losing the outer shade). Exp. al. 16—19 mm. Hindwings brassy brown (varying in the intensity of their colouring and becoming in some specimens dark tawny brown), cilia scarcely paler. Abdomen varying from pale grey to brown and dark brownish fuscous. Legs cinereous (varying to brownish fuscous), with strong tarsal annulations.

Larva "spinning together leaves of a tree unknown to me by name. The tree in question superficially resembles box; but the leaves are somewhat larger, and have a strong, rather unpleasant smell" (Blackburn)[1].

Type (66 : 81. 7) *Oahu*, Mus. Br.

HAB. KAUAI : Kaholuamano, 4000 ft., (8) IV. 1895 ; Mts., 3000—4000 ft., (1) V. 1894, (6) VI. 1894 ; Lihue, 4000 ft., (1) VII. 1896 (Perkins).—OAHU : Mts., (Blackburn)[1] ; Waianae Mts., 2000 ft., (2) IV. 1892 ; Mts., near Honolulu, 2000 ft., (♂ and ♀ *in cop.*) 1896 (Perkins).—MOLOKAI : 3000 ft., (1) VI. 1896 ; above 3000 ft., (2) 13—24. VI. 1893 ; 4000 ft., (4) VI. 1896, (5) 13—23. IX. 1893 (Perkins).—LANAI : 2000 ft., (1) XII. 1893, (1) I. 1894, (3) II. 1894 (Perkins).—MAUI : Haleakala, 5000 ft., (12) V. 1896, (8) X. 1896 (Perkins).—HAWAII : Kona, 3000 ft., (4) VI. 1892 ; ? ft., (3) VII. 1895 ; 2000 ft., (2) IX. 1892 ; ? ft., (1) I. X. 1892 ; Mt. Kilauea, ? ft., (1) VIII., 1896 ; Olaa, ? ft., (1) IX. 1896 ; Hilo, 2000 ft., (1) XII. 1895 (Perkins). Seventy specimens.

This is a most variable species, but having regard to the equally divergent series of *Proteopteryx emarginana*, Wlsm., from California, and of *Strepsicrates ejectana*, Wkr., from Australia, both more easily separable by their generic characters than by their patterns or colouring from the subject before me, I cannot regard any of the numerous forms included in Mr Perkins' various consignments as entitled to special distinction.

38. CROCIDOSEMA, Z.

Type *Crocidosema plebeiana*, Z. (Z. 1847).

CROCIDOSEMA, Z., Is. **1847**, 263 ; Stgr.-Wk., Cat. Lp. Eur. 263, No. 131 (1871) ; Stgr.-Rbl., Cat. Lp. Pal. II. 110, No. 248 (1901).

Dr. Butler [Ann. & Mag. NH. (5. s.) VII. 393—4 (1881)] used the name *Proteopteryx*, Wlsm., in connection with *Crocidosema plebeiana*, Z. (= *Proteopteryx blackburnii*, Btl.) and having some recollection of the circumstances I fear I must hold myself partially responsible for the error. The superficial resemblance to *Proteopteryx emarginana*, Wlsm., then fresh in my mind, was so strong that without a careful examination of structual characters (for which I had no opportunity) the opinion then expressed appeared at the time to be justified.

366. (1) *Crocidosema plebeiana*, Z. (Pl. X. fig. 15).

n. syn. = *blackburnii*, Btl. ♂ (et. var., Btl. ♀).

Crocidosema plebejana, Z., Is. **1847**, 721—2 ; Stgr.-Wk., Cat. Lp. Eur. 263, No. 1269 (1871)[1], etc.

Proteopteryx blackburnii, Btl., Ann. & Mag. NH. (5. s.) VII. 393—4, No. 26 (1881)[2] ♂.

Proteopteryx blackburnii, Btl., var., Btl., Ann. & Mag. NH. (5. s.) VII. 394 (1881)[2] ♀.

Crocidosema plebeiana, Meyr., Pr. Lin. Soc. NSW. VI. 659—60 (1881)[3] ; Wlsm., Pr. Z. Soc. Lond. **1897**, 127, No. 174[4] ; Stgr.-Rbl., Cat. Lp. Pal. II. 110, No. 1968 (1901)[5].

Hab. EUROPE[1, 3, 4–5] [larva *Althea rosea*, *Lavatera arborea*, IX.—II. Imago II.—V., IX.[4]]. AUSTRALIA[3, 4–5]. WEST INDIES[4]. CENTRAL AMERICA[5]. SOUTH AMERICA[5]. BRAZIL[4]: PERU[4]; ARGENTINA[4]. HAWAIIA. Kauai: Kaholuamano, 4000 ft., IV. 1895 (Perkins).—Oahu: Waialua beach, II. 1893; Waianae Mts., 2000 ft., IV. 1892 (Perkins).—Molokai: above 3000—4000 ft., 9—13. VI. 1893 (Perkins).—Lanai: 2000 ft., VII. 1894 (Perkins).—Maui: Makawao (Blackburn)[2]; Haleakala, 5000 ft., V. 1896 (Perkins).—Hawaii: Hualalai (Kona), 5000 ft., VI. 1892 (Perkins). Twenty-six specimens.

The specimens of *Proteopteryx blackburnii*, Btl., in the British Museum and in Mr. Blackburn's collection are *Crocidosema plebeiana*, Z., a species which will probably be found to have even a wider distribution than has yet been recorded.

39. Gypsonoma, Meyr.

GYPSONOMA, Meyr., HB. Br. Lp. 481 (1895); Stgr.-Rbl., Cat. Lp. Pal. II. 112, No. 250 (1901).

367. (1) *Gypsonoma leprarum*, sp. nov. (Pl. X. fig. 16).

Antennae whitish ochreous, slightly shaded above. Palpi roughly clothed above and beneath, whitish ochreous; terminal joint short, depressed, brownish. Head whitish ochreous. Thorax whitish, tinged with ochreous and mottled with fawn-brown. Forewings whitish, with an ochreous tinge; a narrow band of pale fawn-brown at about one-fourth tends obliquely outward to the fold, below which it is deflexed to the dorsum, forming the outer edge of a brownish fuscous dorsal patch; after a band of the pale ground-colour a broad costal shade, commencing before the middle, extends to the apex, it consists of different shades of brown streaking, varying from light fawn to brownish fuscous, and is broken by five pairs of geminate whitish ochreous costal streaklets; the first pair, about the middle, very close together; the second pair farther apart, all tending obliquely outward and ending in leaden grey lines; the outer pair, before the apex, broader and more conspicuous than the others and decidedly less oblique; the dark brown colouring about the apex is attenuated downward along the termen and within it are two blackish dots forming part of a pale ocelloid patch on the inner side of which is some fawn-brown shading above and before the tornus; cilia whitish, profusely speckled with fuscous and tipped with fawn-brown. Exp. al. 12 mm. Hindwings and cilia pale rosy grey. Abdomen pale brownish ochreous. Legs whitish ochreous.

Type ♀ (26256); ♂ (26255) Mus. Wlsm.

Hab. Molokai: sea-level, V. 1893. Two specimens.

In the ♂, which is in poor condition, the costal shade is much less intense—partly through denudation.

40. ADENONEURA, gen. nov.

(ἀδήν = a gland ; νεῦρον = a nerve.)

Type *Adenoneura falsifalcellum*, Wlsm.

Antennae (♂) simple. Palpi somewhat slender, extending less than the length of the head beyond it; median joint somewhat recurved, terminal joint short, porrect. Head thickly clothed. Thorax smooth. Forewings (♂) without a costal fold; costa slightly arched, apex obtusely angular, termen sinuate, not oblique, tornus rounded: neuration 12 veins, all separate, 7 to termen. Hindwings rather broader than the forewings, scarcely sinuate; ♂ with a strong glandular fold on the underside on vein 1^c, extending nearly its whole length: neuration 8 veins; 3 and 4 stalked, 5 slightly approximated to 4 at base; 6 and 7 separate, but tending to coincide towards their base. Abdomen somewhat stout. Legs smooth.

This genus, with *Prionoglossa*, Wlsm., and *Pilopteryx*, Wlsm., form a group allied to *Thiodia*, Hb., from which they differ in possessing abnormal structures in the hindwings.

368. (1) *Adenoneura falsifalcellum*, sp. nov. (Pl. X. fig. 17).

Antennae brownish cinereous. Palpi pale cinereous. Head and Thorax brownish cinereous. Forewings pale brownish cinereous, tending to a lighter shade below the fold, streaked and mottled with ferruginous and dark chestnut-brown; a series of alternately broad and narrow streaks along the costa, tending obliquely outward, those beyond the middle produced in ferruginous lines toward the termen; a large ferruginous and chestnut-brown patch is placed obliquely about the middle of the wing, its base resting on the fold, below which is a small double patch of black scales, its outer margin bounded by whitish scaling, especially about the end of the cell, accompanied and followed by shades of bluish grey reverting above in short streaks toward the middle of the costa; a triangular ferruginous patch at the extreme apex is bounded internally by a narrow whitish cross-line and externally by the shining white cilia on the upper half of the termen, below it is a curved dark umber-brown shade, extending over the lower half of the termen and its cilia to the tornus, bounded on its inner side by the curved silvery grey outer band of an indistinct ocelloid patch containing three dentate blackish spots on its outer half. Exp. al. 18—21 mm. Hindwings dark greyish brown, with a greenish iridescence; cilia pale cinereous, with a greyish brown line running through them near their base. Abdomen greyish brown, shaded with fuscous. Hind Legs whitish ochreous, the tarsi banded with greyish fuscous.

Type ♂ (27506) Mus. Wlsm.

HAB. HAWAII: Olaa, (1) VII. 1895, 2000 ft., (6) XI. 1896. Seven specimens, all ♂♂.

In some specimens the ferruginous and chestnut-brown, obliquely placed, patch extends to the base of the wing along the costa and fold, forming a conspicuous dark costal triangular patch, the remainder of the wing, with the exception of the anteterminal dark shading, varying from pale ochreous to brownish ochreous.

The strongly falcate appearance of this species is not structural but is caused by the apical markings.

369. (2) *Adenoneura? marcidellum*, sp. nov. (Pl. X. fig. 18).

Antennae brownish fuscous. Palpi brown, shaded with fuscous externally. Head brown. Thorax fawn-brownish, with a dark fuscous patch posteriorly. Forewings fawn-brownish, with a dark fuscous basal patch to one-third, angulated outward on the fold, its basal and costal portion mottled with the paler ground-colour; a large creamy white oblique trapezoidal dorsal patch extends over the fold emitting a reduplicated pale band, on its inner side, which reverts to the costa bounding the basal patch; this band is margined by a brownish fuscous shade along its outer side which covers the end of the cell throwing a branch to the apex, along the upper edge of the ocelloid patch, and another along its inner edge to the dorsum; the costa is marked with alternate broad and narrow brownish fuscous streaks, the latter somewhat less oblique than the former, separated by pale marginal spots of which two before the dark brownish fuscous apex are more conspicuous than the others; the ocelloid patch contains a brownish centre with three short dark fuscous transverse streaks set on a ground of rather shining, greyish scales, the space between this and the terminal cilia being also brown; cilia brownish ochreous. Exp. al. 20 mm. Hindwings dark brownish grey, with paler cilia. Abdomen dark brownish grey. Legs whitish ochreous, with greyish tarsal bands.

Type ♀ (25001) Mus. Wlsm.

Hab. Oahu: Waianae Mts., iv. 1892. Unique.

In the absence of the ♂ the genus cannot be determined with certainty.

370. (3) *Adenoneura plicatum*, sp. nov. (Pl. X. fig. 19).

Antennae greyish ochreous, faintly banded above with brownish cinereous. Head and Palpi hoary greyish. Thorax brownish grey, speckled with pale cinereous. Forewings dull brownish olivaceous, profusely speckled with shining pale cinereous, breaking into a long series of indistinct closely packed oblique costal streaks; an ocelloid patch above the tornus contains four elongate black spots and is bounded on its outer side by shining leaden grey, of which there is also a slight suffusion before it and obliquely across the outer end of the cell; cilia tawny grey, a brownish marginal line along their base. Exp. al. 17—20 mm. Hindwings (♂ with a strong glandular fold from the base beneath along vein 1^c) brownish grey, with paler cilia. Abdomen brownish grey. Legs inclining to ochreous.

Type ♂ (25717); ♀ (25615) Mus. Wlsm.

HAB. HAWAII: Hualalai, (Kona), summit of crater, 8000 ft., (1) 15. VIII. 1892; Kona, 4000 ft., (1) 13. VIII. 1892, above 6000 ft., (1) 30. VIII. 1892; Mt. Kilauea, ? ft., (1) XII. 1896; Mauna Loa, 4000 ft., Larva in seeds of native *Acacias* (Perkins 1 : 1900). Five specimens.

The ♀ is in very poor condition.

371. (4) *Adenoneura latifemoris*, sp. nov. (Pl. X. fig. 20).

Antennae greyish fuscous. Palpi and Head hoary cinereous. Thorax greyish fuscous, sprinkled with pale cinereous. Forewings olive-brownish, profusely dusted with leaden grey, on the basal third obliterating the ground-colour, beyond one-third this is broken up into a series of about seven indistinct, oblique, shining, leaden grey costal streaks, of which the last before the apex meets the lower extremity of the one preceding it; on the middle of the dorsum arises an outwardly oblique, broad, shining, leaden grey dorsal streak, overflowing the end of the cell and reverting thence towards the tornus, but again angulated upward before reaching it and ultimately recurved inward at its apex; the antetornal space which it encloses is sprinkled with black scales, a few other small black scale-patches occur above and beyond it and a terminal line of black scales along the base of the shining, tawny grey cilia. Exp. al. (♂) 13—15 (♀) mm. Hindwings (♂ with a strong fold beneath on vein 1^c) greyish brown with paler cilia. Abdomen fuscous, whitish beneath. Legs pale cinereous, hind tarsi with tawny greyish bands.

Type ♀ (28127) *Maui*; ♂ (28665) *Hawaii*, Mus. Wlsm.

HAB. MAUI: Haleakala, crater (♀) X. 1896.—HAWAII: Hualalai, summit of crater, 8000 ft., (♂ ♀) 15. VII. 1892. Three specimens.

The ♂ is smaller than the ♀, with rather less black scaling, especially along the termen, and with the leaden grey markings indistinct and less continuous, being broken into spots indicating the direction of the lines described in the ♀. Both sexes occurred at the summit of Hualalai but the ♀ is in poor condition.

372. (5) *Adenoneura montanum*, sp. nov. (Pl. X. fig. 21).

Antennae pale brownish cinereous. Palpi not extending beyond the head; pale brownish cinereous, the short terminal joint fuscous at the base. Head brown. Thorax brownish, thickly dusted with pale cinereous. Forewings dull chestnut-brown, profusely reticulated (to the extent of suffusion) with light brownish cinereous, forming a series of geminated costal strigulae; an ocelloid spot above the tornus contains about four black scale-points and is bounded before and behind by a **V**-shaped leaden grey shade; the termen beyond it is dull chestnut-brown and a darker brown line runs along the base of the tawny brownish cilia. Exp. al. 10—12 mm. Hindwings (♂ with a glandular fold beneath on vein 1^c) brownish fuscous; cilia brownish cinereous, with a shade-line near their base. Abdomen fuscous. Legs pale brownish cinereous, the last three tarsal joints with fuscous spots.

Type ♂ (27483); ♀ (25275) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, (7) VII. 1895, (1) VIII. 1895, (1) VIII. 1896; Kona, 4000 ft., (1) 10. VIII. 1892, (1) 8. IX. 1892. Eleven specimens.

373. (6) *Adenoneura rufipennis*, Btl. (Pl. X. fig. 22).

Phoxopteris rufipennis, Btl., Ann. & Mag. NH. (5. s.) VII. 395, No. 28 (1881)[1].

Antennae brownish ochreous. Palpi brownish ochreous. Head and Thorax pale reddish brown. Forewings brownish ochreous, profusely striated throughout with reddish brown and leaden grey, the latter in slender streaks running obliquely outward from the costa and forming some leaden grey spots about the end of the cell, and on either side of the ocelloid patch, above the tornus, which contains three black dots, the apex and upper half of the termen reddish brown; cilia leaden grey, mixed with brownish ochreous. Exp. al. 10 mm. Hindwings (♂ with a glandular fold beneath on vein 1^c) brownish grey; cilia pale cinereous. Abdomen brownish grey. Legs brownish grey, with pale tarsal bands.

Type (109 : 81. 7) *Oahu*, Mus. Br. [Caenotype ♀ (25097); ♂ (25094) *Oahu*, Mus. Wlsm.]

HAB. KAUAI: Kaholuamano, 4000 ft., (1) IV. 1895; Lihue, 4000 ft., (1) VII. 1896 (Perkins).—OAHU: (Blackburn)[1]; Waianae Mts., 2000 ft., (7) IV. 1892; Halemano, about 2000 ft., (1) XII. 1892 (Perkins).

Beaten from "Koa" (*Acacia koa*) and "Lehua" (*Metrosideros polymorpha*), Perkins MS.

41. CRYPTOPHLEBIA, Wlsm.

Type *Cryptophlebia carpophaga*, Wlsm. (India).

CRYPTOPHLEBIA, Wlsm., Ind. Mus. Notes IV. 105 (1899).

Antennae (♂) moderately stout, simple, about half the length of the forewings. Palpi short, stout, projecting scarcely half their length beyond the head; terminal joint short, depressed; median joint thickly clothed above and below with closely packed scales, giving a somewhat triangular appearance. Head thickly clothed above. Thorax stout, smooth. Forewings about twice as long as broad, costa scarcely convex, termen oblique, tornus rounded, dorsum somewhat abruptly angulated near the base: neuration 12 veins, 2 from a little beyond middle of cell; 3, 4, and 5 closely approximate at the lower angle of cell; 7 and 8 separate, enclosing the apex. Hindwings (♂) about as broad as the forewings, triangular, apex depressed, limbus shortened, very hairy; with a pouch-like fold along vein 2, containing a thick tuft of scales on the upper side, accompanied by some strongly curved scales on the underside along the margin: neuration 8 veins; ♂ with vein 2 concealed in the tuft of scales; 3 and 4 separate, but very closely approximate; 5 closely approaching 6 at the outer margin; 6 and 7 normal, but somewhat bent downwards at their origin; 8 free: ♀ with 3 and 4 stalked. Abdomen densely hairy above. Legs, all the tibiae thickly tufted, first tarsal joints of the hindlegs also tufted.

This genus comes into the same group as *Platypeplum*, Wlsm. (=†*Platypeplus*, Wlsm.) and *Ecdytolopha*, Z.

374. (1) *Cryptophlebia illepida*, Btl. (Pl. X. figs. 23—25).

374^{a}. (1^{a}) *illepida*, Btl. + *illepida*, Btl. (Pl. X. fig. 23).

= *Teras illepida*, Btl., Tr. Ent. Soc. Lond. **1882**, 42, No. 14.

Antennae, Palpi, Head and Thorax reddish fawn; the last shaded with greyish fuscous above and at the ends of the tegulae. Forewings pale fawn-reddish, with indistinct transverse waved greyish fuscous striae, and a few dots of blackish scales, a minute dot of white scales at the end of the cell, the dorsum near the base also sprinkled with blackish scales; before the tornus is a ferruginous triangular patch, sprinkled with blackish scales which run through the tornal cilia; cilia reddish fawn, somewhat mottled with greyish fuscous. Exp. al. (♂♀) 18—22 (♀) mm. Hindwings greyish fuscous, ♂ with dark fuscous scales in the fold; cilia of the ♂ whitish, of the ♀ brownish grey, with a dark line running through them near their base; underside strongly mottled. Abdomen greyish fuscous, anal tuft pale cinereous. Legs pale cinereous.

Type (99: 81. 7) *Oahu*, Mus. Br. [Caenotype ♂ (25231) *Hawaii*; ♀ (25003) *Oahu*, Mus. Wlsm.]

HAB. OAHU: Honolulu (Blackburn)[1], bred from seeds of *Acacia farnesiana* (Perkins); Waialua, coast, III. 1901; Waianae Mts., 2000—3000 ft., IV. 1892; Koolau Range, VII.—VIII. 1901 (Perkins).—HAWAII: Kona, 4000 ft., 17. VIII. 1892 (Perkins).

374^{b}. (1^{b}) *illepida*, Btl. + *fulva*, var. nov. (Pl. X. fig. 24).

Antennae, Palpi, Head and Thorax, varying from reddish fawn to dark tawny brownish. Forewings varying from reddish fawn to dark tawny brownish; with a basal patch covering nearly one-third of the wing-length, strongly angulated outward a little above the fold; this patch is fawn-grey, or fawn-brownish, mixed with greyish or brownish fuscous, the latter prevailing toward its outer edge, with some costal streaklets within it; beyond is an oblique transverse band from the middle of the costa, running in the direction of a triangular reddish brown antetornal spot, its edges sinuate, its colour, for the most part, tawny greyish fuscous, with a minute dot of white scales at the end of the cell; a somewhat similar band occurs before the apex, reaching to the middle of the termen, the apical space beyond it reddish fawn, slightly darker than the space preceding the band, which like the middle of the dorsum is of a paler shade faintly reticulated; cilia greyish fuscous, tipped with pale fawn. Exp. al. ♂ 17; ♀ 18—22 mm.

Type ♂ (25183); ♀ (25649) *Hawaii*, Mus. Wlsm.

HAB. OAHU: Honolulu, (4) bred from seeds of *Acacia farnesiana*; S.E. Koolau Range, (3) VII. 1900.—HAWAII: Kaawaloa (Kona), 1500 ft., (1) VI. 1892, (1) IX. 1892; Mt. Kilauea, (1) VII. 1895; Kona, 4000 ft., (4) 8—17. VIII. 1892, (1) IX. 1892. Fifteen specimens.

In some specimens (♀♀) the darker colour suffuses the wing obscuring the markings, but the antetornal triangular patch is always distinct.

374^c. (1^c) *illepida*, Btl. + *suffusa*, var. nov. (Pl. X. fig. 25).

Antennae and Palpi dark brown. Head greyish fuscous. Thorax dark greyish fuscous above, reddish brown posteriorly, the tegulae reddish brown tipped with greyish fuscous. Forewings dark reddish brown, fading to fawn-brownish along the dorsum below the fold; a broad brownish fuscous suffusion, above the fold, extends from near the base to the lower half of the termen, reaching upward to the costa, but leaving the reddish brown apex unclouded; on this some geminated brown costal streaks are visible, and three or four white scales occur in a group at the end of the cell; on the dorsum before the tornus is a dark reddish brown triangular patch transversely streaked with fuscous; cilia tesselated with reddish brown and greyish fuscous. Exp. al. 21 mm.

Type ♂ (25184) Mus. Wlsm.

HAB. HAWAII: Kona, 4000 ft., IX. 1892. Unique.

Closely allied to *Cryptophlebia carpophaga*, Wlsm. [Ind. Mus. Notes IV. 105—6, Pl. IV. 1^{a-d} (1899): V. 121, Pl. XV. 2, 2^{a-b} (1903)], but one noticeable difference is that the shade which arises from the dorsum is distinctly more oblique and further removed from the antetornal spot than in the Indian species; moreover, in such specimens as possess a transverse anteapical shade, this assumes the appearance of a somewhat widened band rather than of a narrow curved line. The larva of *C. carpophaga* feeds in the pods of *Cassia fistula* and *occidentalis*, and also on seeds of *Nephelium litchi*.

The genus *Cryptophlebia* will probably be found to be widely distributed as *C. citrivora*, Wlsm., is injurious to the fruits of *Citrus* in Natal and *Arotrophora ombrodelta*, Lwr. & Frgt. (which must also be removed to *Cryptophlebia*) feeds in New South Wales on the seeds of *Acacia farnesiana*, like *illepida*, Btl., of which Perkins writes "♂ any colour, ♀ not variable," but I find the ♀ very variable and until the larvae have been studied the number of species must be doubtful.

375. (2) *Cryptophlebia tetrao*, sp. nov. (Pl. X. fig. 26).

Antennae brownish cinereous. Palpi cinereous, the terminal joint ferruginous. Head and Thorax cinereous, the latter mottled with reddish brown. Forewings whitish cinereous, shaded and speckled with tawny grey and reddish ferruginous, the first forming an indistinct central band which terminates at the tornus in a bright reddish ferruginous spot containing some black scales, a smaller spot being indicated in the middle of the fold and also speckled with the same; some tawny grey shading, before the apex, is much mixed with bright reddish ferruginous which is strongly indicated about the extreme apex and upper half of termen; cilia dark tawny grey, mixed with reddish ferruginous. Exp. al. 14—16 mm. Hindwings brownish grey, with slightly paler cilia; with some similarly paler scales in a tuft on the glandular swelling on vein 1^c. Abdomen greyish; anal tuft inclining to ochreous. Legs whitish ochreous, hind tarsi banded above with tawny grey.

Type ♂ (25224) Mus. Wlsm.

HAB. HAWAII: Kona, 3500 ft., 25—29. VI. 1892. Two specimens.

Both specimens are in poor condition, but the species is obviously distinct.

376. (3) *Cryptophlebia vulpes*, sp. nov. (Pl. X. fig. 27).

Antennae reddish brown. Palpi tawny reddish. Head and Thorax reddish brown, the latter with a fuscous blotch posteriorly. Forewings reddish brown, faintly mottled with pale cinereous; an oblique, transverse, median fascia of the darker ground-colour, with a minute white dot on the middle of its outer side, is indistinctly indicated as also two or three costal spots before the apex, a triangular patch of black scales beyond the cell, its narrow apex resting on the lower half of the termen; a small black spot beyond its base almost at the apex; cilia reddish brown, mixed with black scales. Exp. al. 12 mm. Hindwings brownish grey; with a glandular fold, on the outer half of vein 1^c beneath, having some black scales at its termination; cilia greyish. Abdomen greyish, mixed with fuscous. Legs pale cinereous, the last tarsal joints faintly spotted.

Type ♂ (27465) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VIII. 1895. Unique.

42. ENARMONIA, Hb.

Type *Tortrix woeberiana*, Schiff (Stph. 1852).

ENARMONIA, Hb., Verz. bek. Schm. 375 (1826); Stph., Ill. Br. Ent. Haust. IV. 120—1, 418 (1834): List, Br. An. BM. x. Lp. 49 (1852); Meyr., HB. Br. Lp. 472 (1895); Wlsm., Pr. Z. Soc. Lond. **1897**, 122, No. 59.

377. (1) *Enarmonia* (?) *conspicua*, sp. nov. (Pl. X. fig. 28).

Antennae brownish cinereous. Palpi projecting slightly beyond the head; fawn-whitish, shaded with fuscous externally. Head and face whitish, with a rust-brown collar between the head and the dirty fawn-whitish Thorax which is not tufted. Forewings, costa slightly arched beyond the middle, apex obtuse, termen scarcely sinuate, obliquely rounded; fawn-whitish, conspicuously marked with rust-brown; a large triangular rust-brown costal patch from base to two-thirds, overlapping the fold, is strongly tinged with fuscous along its lower margin and in a projecting excrescence before the lower angle of the cell, pointing toward the tornus; two small rust-brown costal spots beyond it are followed by an apical shade of the same colour, which extends to the lower half of the termen, where it is preceded by three blackish dots, accompanied by obscure leaden grey scales forming an ocelloid spot above the tornus; cilia pale tawny fawn, mixed with fuscous on the middle of the termen and at the apex. Exp. al. 22 mm. Hindwings and cilia brownish grey. Abdomen brownish grey. Legs cinereous, with fuscous tarsal bands.

Type ♀ (28134) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., x. 1896. Unique.

In the absence of the ♂ the genus cannot be determined with certainty.

378. (2) *Enarmonia walsinghami*, Btl. (Pl. XI. fig. 1).

Proteopteryx walsinghamii, Btl., Tr. Ent. Soc. Lond. **1882**, 43 (1882)[1].

Antennae pale brownish cinereous. Palpi pale cinereous, shaded nearly to the end of the median joint with fuscous in the darker varieties. Head pale cinereous. Thorax cinereous, a broad band across the base of the tegulae in some pale forms. Forewings, ♂ olive-grey, with a greenish tinge, blending to olive-brown in a series of oblique costal streaks and in a dorsal patch beyond the middle as also in a narrower dorsal patch before the middle; the costal streaks, to the number of about nine, are fuscous at their base, the bases of those beyond the middle being triangular and there is a strong fuscous shade along the middle of the wing, widening outward from the base to the termen; an indistinctly indicated ocelloid patch, above the tornus, is bounded by pale steel-grey and contains three ill-defined black streaklets; a dark line runs along the base of the greyish fuscous cilia: ♀ whitish, thickly mottled and blotched with rich olive-brown and dark umber-brown on the basal two-thirds and about the apex and termen, leaving a conspicuous white patch crossing the end of the cell; the dark umber-brown is distributed from the base along the first half of the fold in an elongate patch on the outer half of the cell and in a series of costal streaks, of which one at about one-fifth from the base and another a little before the middle are produced obliquely downwards, being thus longer and more conspicuous than the others; there is an umber-brown spot at the apex, mixed with olive-brown, and a shade of the same mixture along the lower half of the termen, thence slightly inverted upward, the intermediate spaces between the dark umber markings and along the dorsum are filled up with rich olive-brown, in which the whitish ground-colour scarcely appears before the end of the cell, except to partially isolate a large quadrate olive-brown dorsal patch before the tornus, beyond which an ill-defined ocelloid patch is outwardly bounded by shining, silvery scales; the dark costal streaks on the outer half of the wing are distinctly separated by white, and some pale olivaceous-brown shading precedes the darker terminal shade on the white ground-colour; cilia transversely mottled with umber-brown and olive-brown, becoming whitish above the tornus. Exp. al. ♂ 11—14; ♀ 11—18 mm. Hindwings, ♂ greyish fuscous; cilia pale greyish cinereous: ♀ brownish cinereous; cilia paler, a dark shade running through them near their base in both sexes. Abdomen, ♂ fuscous: ♀ brownish cinereous. Legs, ♂ greyish cinereous: ♀ brownish cinereous, hind tarsi whitish.

Type (161: 81. 7) *Oahu*, Mus. Br. [Caenotype ♂ (28075); ♀ (25765) *Hawaii*, Mus. Wlsm.]

HAB. OAHU: Honolulu (Blackburn)¹.—HAWAII: Kona, 4000 ft., (2) 20. VII., (3) 10—12. VIII., (1) 9. IX. 1892; Hualalai (Kona), 5000 ft., (1) 5. VIII. 1892; Mt. Kilauea, (3) VIII. 1896; Hilo, 2000 ft., (1) XII. 1895 (Perkins). Eleven specimens.

This species is very closely allied to the European *corticana*, Hb., and so far as one can judge from a small series it is equally variable in colour and more variable in size.

The females are all paler than the dark male above described, but some males are decidedly paler (than No. 28075) and show a tendency to greater suffusion and therefore obliteration of defined markings, the median streak being absorbed in the suffused shading, the dorsal markings also being scarcely traceable. On the other hand the females tend to develop more clearly defined spots and blotches, varying rather in the degree of confluence between them than in the amount of general suffusion of the darker colouring over the wing surface—in one specimen the dorsal markings are confluent, forming a dark blotch which spreads across the wing to the costa.

379. (3) *Enarmonia crassicornis*, sp. nov. (Pl. XI. fig. 2).

Antennae broad, somewhat flattened, very minutely ciliate; brownish cinereous. Palpi projecting half the length of the head beyond it; white. Head and Thorax white, the latter with a narrow anterior band of greyish fuscous and a greyish fuscous shade at the base of the tegulae. Forewings white, with a broad greyish fuscous shade occupying the costal half at the base, following the upper edge of the fold to beyond its middle, its outer edge, thence reverting obliquely to the costa at two-thirds from the base; upon this costal blotch is some ferruginous mottling and a series of short, oblique, ferruginous costal streaks which are continued beyond it to the apex; a terminal greyish fuscous shade projects inwards from the apex and is reduplicated toward the lower half of the termen, the narrow space between its branches shining, silvery white; cilia white, mottled with greyish fuscous on their upper half. Exp. al. 14 mm. Hindwings greyish brown; cilia brownish cinereous. Abdomen greyish brown. Legs greyish brown, with whitish cinereous spurs and tarsi.

Type ♂ (25212) Mus. Wlsm.

HAB. HAWAII: Kona, above 4000 ft., IX. 1892. Two specimens.

380. (4) *Enarmonia* (?) *storeella*, sp. nov. (Pl. XI. fig. 3).

Antennae cinereous. Palpi projecting very slightly beyond the head; cinereous. Head and Thorax pale cinereous, minutely sprinkled with olive-grey. Forewings pale cinereous, broadly overshadowed with greenish olivaceous in a wide triangular costal patch extending from the base to one-third, its apex overlapping the fold—this patch is greyer on its basal, more greenish on its outer half; the paler ground-colour, remaining below the fold and in a broad ill-defined band arising from the middle of the dorsum and reaching nearly to the costa before the apex, is succeeded by another flush of olivaceous greenish which overspreads the apical and terminal portion of the wing, the whole having a minutely speckled appearance; a slender olive brownish line along the termen before the leaden grey cilia. Exp. al. 14 mm. Hindwings tawny brownish grey; cilia pale tawny grey. Abdomen tawny brownish grey. Legs cinereous, tarsi shaded above.

Type ♀ (28185) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., V. 1896. Unique.

The ♂ is unknown but there can be little doubt that this species is congeneric with *crassicornis*.

381. (5) *Enarmonia* (?) *obliqua*, sp. nov. (Pl. XI. fig. 4).

Antennae greyish fuscous. Palpi and Head whitish cinereous. Thorax cinereous. Forewings whitish cinereous, with pale olive-brown markings and some sprinkling of brownish grey scales between and about them; the markings consist of a series of about eight costal streaks, tending obliquely outwards, the first three meeting a broad pale olive-brown band arising from the dorsum at one-third and tending obliquely outward across the cell, the sixth produced to the middle of the termen and slightly sinuate; a triangular olive-brown dorsal patch before the tornus is sprinkled with blackish scales, the ground-colour before it and around its apex being almost white;

there is a patch of pale olive-brown at the apex, a line of the same running along the base of the whitish cilia and diffused through them about the middle of the termen; on the terminal area of the wing a leaden grey suffusion lies between the olive-brown lines and patches, which are sparsely sprinkled with blackish scales. Exp. al. 14—17 mm. Hindwings dark brown; cilia whitish cinereous, with a dark brown line along their base. Abdomen greyish fuscous above, whitish cinereous beneath and on the anal tuft. Legs whitish cinereous.

Type ♀ (25828) Mus. Wlsm.

HAB. HAWAII: Hualalai (Kona), 5000 ft., 5. VIII. 1892. Two specimens.

In the absence of the ♂ the genus cannot be determined with certainty.

43. BACTRA, Stph.

Type 1. *Tortrix lanceolana,* Hb. (Stph. 1834).

= § *APHELIA,* Stph., Cat. Br. Ins. II. 180 (1829); Stgr.-Wk. Cat. etc.
BACTRA, Stph., Ill. Br. Ent. Haust. IV. 124 (1834); Fern., Meyr., Stgr.-Rbl. Cat. etc.
= *LEPTIA,* Gn., Ann. Soc. Ent. Fr. XIV. (2. s.) III. 169 (1845): Ind. Meth. 35 (1845).

Type 2. *Chiloides straminea,* Btl. (Btl. 1881).

= *CHILOIDES,* Btl., Ann. & Mag. NH. (5. s.) VII. 392—3 (1881).

Type 3. *Noteraula straminea,* Meyr. (nec Btl.).

=* *CHILOIDES,* Meyr., Tr. N.Z. Inst. XVII. 142 (1885).
= NOTERAULA, Meyr., Tr. N.Z. Inst. XXIV. 217 (1892).

382. (1) *Bactra straminea,* Btl. (Pl. XI. fig. 5).

Chiloides straminea, Btl., Ann. & Mag. NH. (5. s.) VII. 393, No. 25 (1881)[1]; Meyr., Tr. N.Z. Inst. XVII. 142 *partim* (1885)[2].

This species is so similar to *Bactra lanceolana,* Hb., in the variation of its colouring that a detailed description made from a single specimen could only be misleading.

The ground-colour is for the most part pale fawn (certainly browner than the general idea of the meaning conveyed by the word "stramineous" as used by Butler). The speckling along the costa and dorsum as well as on the disc and the slender lines indicating the pattern of the neuration (always more noticeable) are of a darker fawn-brown, or even fuscous tint, tending in some cases to blackish. The main feature of the variation is in the degree of insistence of a dark shade running from the base to the apex through the middle of the wing, in some specimens this is strongly marked, and is diffused downward nearly to the dorsum, in others it is entirely absent, but the spots at the end of the cell and at the basal third of the fold are nearly always recognisable in addition to the speckled appearance of the wing-surface, especially along the margins. In size the species also varies considerably (Exp. al. 14—34 mm.) as is the case with its European representative, and were it not for the uniformly greater length of the palpi one could scarcely hesitate to regard it as a mere geographical variety of our well-known *Bactra lanceolana* presenting some exaggerated forms approaching in the width of the wing the larger variety of this insect which has so frequently been suspected of special distinction. (Described from a series of forty-six specimens.)

Type (101 : 81. 7) *Oahu*, Mus. Br.

HAB. KAUAI : Kaholuamano, 4000 ft., IV. 1895 ; Makaweli, sea level, VI. 1894 ; Lihue, 1500 ft., 1896 ; Mts., 3000—4000 ft., VI. 1894 (Perkins).—OAHU : Salt marshes near Honolulu (Blackburn)[1] ; near head of Kawailoa Gulch, IV. 1893 ; Pauoa, 2000 ft., VI. 1895 ; Mts., near Honolulu, VIII. 1900, 2000 ft., 27. X. 1892 (Perkins).—MOLOKAI : forest above Pelekunu, VIII. 1893 ; Mts., above 3000 ft., 16. IX. 1893, about 4000 ft., 23. IX. 1893 (Perkins).—LANAI : 2000 ft., VII. 1894 (Perkins).—MAUI : Haleakala, 5000 ft., V. 1896 (Perkins).—HAWAII : Kona, 3000 ft., IV. 1896, about 3500 ft., 21. VII. 1892, above 2000 ft., IX. 1892 ; Mt. Kilauea, VIII. 1895 (Perkins). Forty-six specimens.

After examining a very long series of this species I find I can separate it from *lanceolana*, Hb., by one character only, viz., the comparative length of the palpi which in the European species are distinctly shorter. In all other respects the numerous varieties found in both regions can be absolutely matched.

In company with others, at least equally competent to form an opinion, I have hitherto regarded *straminea* as inseparable from *lanceolana*, Hb., but if we admit the value of the longer terminal joint of the palpi, which certainly enables us to separate the Hawaiian from the European form, the name *straminea* may be retained to designate this geographical and local race.

When describing *Chiloides*, Butler called attention to the "separate emission of the second and third median branches" of the hindwings, this observation applies equally to very numerous specimens of our common *Bactra lanceolana* although not to all, and in the Hawaiian series exactly similar specimens from the same locality taken on the same day vary in this particular.

Meyrick [Tr. N.Z. Inst. XVII. 142 (1885)] has drawn especial attention to the identity of the New Zealand and Hawaiian species, and in redescribing *Chiloides*, Btl., (subsequently changed to *Noteraula*, Meyr.) he laid great stress upon the structure of the antennae, but a careful examination and comparison shows that in the Hawaiian examples they are uniformly shortly biciliate, whereas the New Zealand examples are biciliate from 1—1½, the joints having also a more dentate appearance ("antennae in male serrate, with whorls of moderate cilia," Meyr.). In describing the genus *Bactra* from British specimens, Meyrick [HB. Br. Lp. 456 (1895)] uses the words "antennae in ♂ moderately ciliated" in reference to *lanceolana*, Hb., from which the palpi rather than the antennae must be relied upon to separate the Hawaiian species. I have not felt justified in reversing Mr Meyrick's decision on the strength of so slight a difference but its permanence and uniformity throughout the series might not unreasonably be held to constitute a character of special value, and as I am unable to regard *Noteraula*, Meyr., as generically distinct from *Bactra*, Stph., and *Chiloides*, Btl., it would be appropriate that *straminea*, Meyr. (nec Btl.) should bear at least the varietal name *Bactra noteraula* (n. n.).

II. TORTRICINAE.

44. PARARRHAPTICA, gen. nov.

Type *Pararrhaptica perkinsana*, Wlsm.

(παραῤῥάπτειν = to sew on as a fringe.)

Antennae biciliate (½) and serrate towards their apex. Palpi projecting about the length of the head beyond it, median joint rather roughly clothed, terminal joint short, depressed, almost concealed. Head roughened. Thorax not crested. Forewings trapezoidal, costa abruptly angulate towards the base, with narrow costal fold in ♂, shortly ciliate throughout; apex obtuse, termen oblique, scarcely sinuate; ♂ with a patch of long appressed hair-scales along the outer half of the fold: neuration 12 veins, all separate, 7 to termen. Hindwings as broad as the forewings, evenly rounded, scarcely sinuate below the obtuse apex: neuration 8 veins, 3 and 4 from a short stalk, 6 and 7 separate, but approximating towards base. Legs smooth.

Allied to *Archips*, Hb., but distinguished by the fringe of long hairs along the fold in the forewings.

383. (1) *Pararrhaptica perkinsana*, sp. nov. (Pl. XI. fig. 6).

Antennae pale fawn, smeared with fuscous above at the base. Palpi pale fawn, smeared with fuscous externally. Head pale fawn. Thorax whitish fawn. Forewings whitish fawn, shaded with pale fawn, especially on the basal and costal areas and across the middle, the costal fold blackish; six dark fuscous costal spots, one in the middle quadrangular and larger than the others; the first at about one-third is margined on either side by blackish scales which are produced obliquely downward in two broken divergent streaks across the cell; a small blackish spot near the end of the cell is succeeded by a sprinkling of blackish dots in the anteterminal area; a few blackish scales in a waved line at about one-fourth indicate a basal patch and a series of small fuscous dots along the dorsum is continued along the base of the pale fawn terminal cilia; the elongate tuft of obliquely appressed hairs on the outer half of the fold is very pale fawn; the dark markings are visible on the underside. Exp. al. 21 mm. Hindwings and cilia pale fawn-grey, much mottled with greyish fuscous, showing through from the underside of the wing where the spots are more conspicuous. Abdomen cinereous. Legs whitish ochreous.

Type ♂ (28174) *Maui*, Mus. Wlsm.

Hab. Molokai: 3500 ft., (♀) 17. v. 1893.—Maui: Haleakala, 5000 ft., (♂) v. 1896; Olinda (Haleakala), 4000 ft., (♀) v. 1896. Three specimens.

Described from the single ♂ from Haleakala; a ♀ in poor condition from Olinda probably belongs to this species, and another ♀ from Molokai cannot be distinguished from it. In both the females the markings are to some extent evanescent, but they are also partially removed by abrasion.

45. Archips, Hb.

Type *Tortrix piceana*, L. (Hb. 1806).

archips, Hb., Tent. p. [2] (1806); Fernald, Bull. US. Nat. Mus. **52**. 478—81 (1902).
=*cacoecia*, Hb., Verz. bek. Schm. 388 (1826), Hein., Stgr.-Wk., Fern., Meyr., etc.

384. (1) *Archips postvittanus*, Wkr. (Pl. XI. fig. 7).

[?=*retractana*, Wkr.[13]]; =*dotatana*, Wkr.[13]; =*scitulana*, Wkr.[13]; =*basialbana*, Wkr.[13]; =*secretana*, Wkr.[13]; =*secundana*, Wkr.[13]; =*consociana*, Wkr.[13]; =*reversana*, Wkr.[13]; =*foedana*, Wkr.[13]; =*sobriana*, Wkr.[13]; =*immersana*, Wkr.[13]

[? *Teras retractana*, Wkr., Cat. Lp. Ins. B.M. xxviii. 288—9 (1863)[1]]. *Teras postvittana*, Wkr., Cat. Lp. Ins. B.M. xxviii. 297 (1863)[2]. *Teras dotatana*, Wkr., Cat. Lp. Ins. B.M. xxviii. 298 (1863)[3]. *Teras scitulana*, Wkr., Cat. Lp. Ins. B.M. xxviii. 298—9 (1863)[4]. *Teras basialbana*, Wkr., Cat. Lp. Ins. B.M. xxviii. 299 (1863)[5]. *Teras secretana*, Wkr., Cat. Lp. Ins. B.M. xxviii. 300 (1863)[6]. *Pandemis secundana*, Wkr., Cat. Lp. Ins. B.M. xxviii. 310—11 (1863)[7]. *Pandemis consociana*, Wkr., Cat. Lp. Ins. B.M. xxviii. 311—2 (1863)[8]. *Dichelia reversana*, Wkr., Cat. Lp. Ins. B.M. xxviii. 321 (1863)[9]. *Dichelia foedana*, Wkr., Cat. Lp. Ins. B.M. xxviii. 321—2 (1863)[10]. *Dichelia sobriana*, Wkr., Cat. Lp. Ins. B.M. xxviii. 322 (1863)[11]. *Paedisca immersana*, Wkr., Cat. Lp. Ins. B.M. xxviii. 380 (1863)[12]. *Cacoecia postvittana*, Meyr., Pr. Lin. Soc. NSW. vi. 502—4, 702, 703, 705 (1881)[13]; Oliff, Agr. Gaz. NSW. i. 7—8, Pl. I. 2 (1890)[14].

Types ♂ ♀ Mus. Br. *postvittana*, Wkr. ♀; [=*retractana*, Wkr. ♂, according to type, labelled 'Australia,' but not description[13]]; =*dotatana*, Wkr. ♂; =*scitulana*, Wkr. ♂; =*basialbana*, Wkr. ♂; =*secretana*, Wkr. ♀; =*secundana*, Wkr. ♀; =*consociana*, Wkr. ♀; =*reversana*, Wkr. ♀; =*foedana*, Wkr. ♀; =*sobriana*, Wkr. ♀; =*immersana*, Wkr. ♂.

Hab. [? UNITED STATES[1].] AUSTRALIA. NEW SOUTH WALES[2,13], QUEENSLAND[14], TASMANIA[3], VICTORIA[13]. Larva *Corea robusta*[13], *Boronia ledifolia*[13], *Persoonia lanceolata*[13], *Grevillea robusta*[13], *Polygonum*, sp.[13], Apple[14], viii[13], ix[13], i[13], Imago, viii—x[13], i[13], iii—iv[13]. HAWAIIA. Kauai: Lihue, 1896, on introduced *Acacia* (seven specimens, Perkins).

385. (2) *Archips longiplicatus*, sp. nov. (Pl. XI. fig. 8).

Antennae (♂) serrate, biciliate 1½; light mouse-grey. Palpi projecting more than the length of the head beyond it, porrect and somewhat hirsute above; pale mouse-grey. Head and Thorax pale mouse-grey. Forewings with a long loosely turned costal fold reaching to, or beyond, the middle; very pale, shining, mouse-grey, obscurely mottled with brownish grey in some lights, with irregular, large and small, spots consisting of two shades of chestnut-brown; the base of the costal fold is chestnut-brown, with some darker mottling on and beyond it; an irregular quadrate patch of chestnut-brown, margined before and behind by a richer and darker shade of the same, lies at about the middle of the discal cell and is more or less connected with the costa above it and with the dorsum beyond it by irregular spots and smears of the same two shades of colour; an elongate, dark chestnut-brown (almost ferruginous) spot lies beyond it at the end of the cell, with a series of costal spots above it reaching to the apex and some minute dots of the same colour towards the termen; the cilia have a slight tawny tinge and contain a series of somewhat obscure terminal spots along their base. Exp. al. 25 mm. Hindwings and cilia shining, bone-grey with darker spots, and mottlings showing through them. Abdomen pale brownish grey. Legs bone-grey.

Type ♂ (26604) *Maui*, Mus. Wlsm.

In another specimen the antennae are biciliate 1, and dotted above with fuscous to beyond their middle; the thorax with a fuscous spot posteriorly; the wings are of a paler (more ochreous) colour, the darkly margined spots and the base of the costal fold tinged with rust-brown, the square discal spot merged in an outwardly expanding brownish shade, directed towards the tornus. Exp. al. 20 mm. Paratype ♂ (25064—*Oahu*).

In the ♀ the discal spots and central shade are obliterated, showing remnants only of the darker streaks which form their margins, moreover the form of the forewings is very different, the costa being arched at the base only and flattened along the middle. Exp. al. 22 mm. Paratype ♀ (25860—*Oahu*).

Hab. Oahu: Waianae Mts., 2000—3000 ft., (2) iv. 1892; Mts., near Honolulu, 2000 ft., (1) 27. x. 1892.—Lanai: 2000 ft., (1) i. 1894.—Maui: Haleakala, 5000 ft., (1)

2. IV. 1894. HAWAII: 2000 ft., (1) IX. 1892, 3000 ft., (1) IX. 1892; Kona, 4000 ft., (1) IX. 1892. Eight specimens.

Specimens from Hawaii are smaller than from the other islands. Exp. al. ♂ 18—♀ 20 mm.

386. (3) *Archips leopardellus*, sp. nov. (Pl. XI. fig. 9).

Antennae pale fawn-ochreous. Palpi curving downward to more than the length of the head beyond it; very pale fawn, shaded at the sides. Head and Thorax greyish fawn. Forewings (♂) costa much arched, with a long narrow costal fold extending to one-half, not tightly appressed, apex rounded; yellowish fawn, transversely mottled with fawn-grey, and with numerous small umber-brown spots about the terminal, basal, and costal areas; a series of brownish fuscous spots along the costa, of which one, a little beyond the edge of the fold, is rather larger than the four others between it and the apex; across the middle of the wing a slight fawn-grey shade is indicated by broken curved brown streaklets along its margins which are narrowed to a square spot on the middle of the cell; this is succeeded by a rounder spot at the end of the cell, similarly margined with dark brown; cilia pale fawn, somewhat mottled towards the apex. Exp. al. 20 mm. Hindwings pale brownish grey, the mottling of the underside faintly showing through; cilia scarcely paler. Abdomen fawn greyish. Legs very pale whitish ochreous.

Type ♂ (27678) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895. Unique.

The antennal ciliations are much shorter than in *longiplicata*.

387. (4) *Archips punctiferanus*, sp. nov. (Pl. XI. fig. 10).

Antennae (♂) biciliate 1½; pale mouse-colour. Palpi projecting twice the length of the head beyond it, the short terminal joint almost concealed in the clothing of the very long arched median joint; pale mouse-grey on their inner side, darker externally. Head and Thorax mouse-colour; face darker, with a few fawn-brown scales behind the eyes. Forewings with the costa evenly arched throughout, with a long loosely turned costal fold, reaching nearly to the middle, apex moderately acute, termen oblique, slightly sinuate; pale, shining, mouse-colour, with a faintly reticulate appearance, with several small dark brown spots scattered about the surface, some on the middle of the cell and others towards the apex being specially noticeable; the costal fold is dark chestnut-brown towards the base, the costal and terminal cilia being paler chestnut-brown tipped with very light mouse-colour. Exp. al. 26 mm. Hindwings fawn whitish, with grey spots and mottling showing through them. Abdomen very pale mouse-colour. Legs bone whitish.

Type ♂ (26581) Mus. Wlsm.

Hab. Maui: Haleakala, 5000 ft., iii. 1894. One specimen. [? Molokai, about 4000 ft., 9. vi. 1893; ♀ (26103)].

The specimen from Molokai is precisely the form that would be expected in the ♀ of this species. The colour and markings also coincide, but the hindwings are more densely spotted. Exp. al. 22 mm. I am unable to regard it as a separate species although the time of year at which it was taken and the locality preclude any absolute certainty since it is obvious that if the two specimens belong to one species there must be more than one brood in the year and its distribution must be somewhat extended.

388. (5) *Archips trochilidanus*, sp. nov. (Pl. XI. fig. 11).

Antennae (♂) biciliate 1; dark tawny brown. Palpi projecting the length of the head beyond it; dark tawny brown. Head dark brown. Thorax dark tawny brown, sprinkled with green scales. Forewings with a loosely turned costal fold reaching to slightly beyond the middle; dark tawny brown, with numerous large patches and intermediate sprinkling of bright metallic green, tending to form an oblique median fascia and a large subterminal and subapical patch; between these the ground-colour is margined by narrow dark fuscous striae, a series of four costal spots beyond the middle is also tinged with dark fuscous; cilia tawny; underside dark brown, the position of the green markings distinctly indicated on the costa by dull ochreous. Exp. al. ♂ 22; ♀ 31 mm. Hindwings umber-brown; cilia brownish cinereous. Abdomen dark umber-brown. Legs brownish cinereous.

Type ♂ (25170); ♀ (25166) Mus. Wlsm.

Hab. Molokai: 3500 ft., (♀) 17. v. 1893, 3000 ft., (♂) 4000 ft., (♂) vi. 1893. Three specimens.

The ♀ of this species does not appear to differ in the distribution of the markings, it is much worn and decidedly larger than the ♂ and the costa is somewhat more abruptly arched at the base.

389. (6) *Archips fuscoviridis*, sp. nov. (Pl. XI. fig. 12).

Antennae shortly biciliate and serrate; tawny fuscous. Palpi somewhat short, projecting scarcely the length of the head beyond it; median joint densely, but not roughly, clothed above, terminal joint half the length of the median; dark tawny greyish. Head and face roughly clothed, with dense, obtuse, frontal tuft; dark olive-green. Thorax tufted posteriorly; dark olive-green, marked with brownish fuscous.

Forewings with the costa evenly arched before the middle, ♂ with a narrow costal fold at the base, apex somewhat obtuse, termen convex; shining, dark olive-grey, blotched with tawny fuscous; a tawny fuscous streak on the fold near the base is diffused on either side, merging in lines and reticulations of the same colour, forming an indistinct basal patch; beyond this is a similarly indicated pair of oblique fasciae, one before, the other about the middle, not reaching to the dorsum—of the first, the only conspicuous part is a dark tawny fuscous triangular blotch, its lower extremity crossing the fold, on the second a smaller blotch at the end of the cell is noticeable; a tawny fuscous shade along the termen and apex is preceded by another parallel with it, reaching the tornus; the whole central portion of the wing is suffused with a tawny fuscous gloss partially obscuring the green ground-colour; along the dorsum is a series of narrow dark fuscous spots extending around the termen to the apex at the base of the pale tawny cilia. Exp. al. 27 mm. Hindwings tawny grey, with darker greyish mottlings showing through from the underside; cilia pale cinereous. Abdomen brownish grey. Legs pale cinereous.

Type ♀ (26412) *Lanai*, Mus. Wlsm.

HAB. OAHU: NW. Koolau Range, (♂) VII. 1901.—LANAI: 2000 ft., (♀) II. 1894. Two specimens.

390. (7) *Archips* (?) *lichenoides*, sp. nov. (Pl. XI. fig. 13).

Antennae greenish grey, narrowly banded above with black. Palpi rather rough above, projecting about the length of the head beyond it; pale greenish grey. Head and Thorax olive-green, mixed with fuscous. Forewings very roughly clothed, especially along the base of the costa, with an almost equal admixture of olive-green, silvery grey, greyish fuscous and dark fuscous scaling, presenting an evenly mottled and reticulated appearance on which an oblique basal patch, an oblique fasciaform median shade, a dark spot at the end of the cell and four post-median costal blotches are faintly indicated by a preponderance of the darker colouring, the pale greenish grey cilia being also reticulated with two shades of fuscous. Exp. al. 34 mm. Hindwings whitish cinereous, with pale fuscous shades and mottlings; cilia pale, shaded along their base. Abdomen cinereous. Legs pale brownish cinereous, the tibiae and first and second tarsal joints fuscous above.

Type ♀ (28064) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VIII. 1896. Unique.

This species greatly resembles *fuscoviridis*, and might easily be mistaken for its ♀, but the rough scaling at the base of the costa and the more spotted hindwings (which in *fuscoviridis* are rather blotched and streaked) are differences which could not be expected to occur in sexes of one species. This is almost certainly an *Archips* but cannot be referred with certainty to that genus in the absence of the ♂.

391. (8) *Archips* (?) *subsenescens*, sp. nov. (Pl. XI. fig. 14).

Antennae brownish fuscous. Palpi projecting more than the length of the head beyond it, the median joint densely and roughly clothed above, the terminal joint scarcely half the length of the median; hoary white, the basal half of the median joint brownish fuscous. Head and Thorax hoary white, sprinkled with brownish fuscous. Forewings shining, whitish, profusely sprinkled and reticulated with brownish fuscous mixed with pale olive-greenish scales; at the extreme base of the costa are three or four irregular dark brownish fuscous streaks and spots, and two of the same also at the extreme base on either side of the fold; a series of upright dorsal streaklets before the middle precede an irregular ill-defined oblique central fascia, narrowed to a quadrate spot at the upper edge of the cell, this fascia is wider on its lower half than above, its margins irregularly angulated throughout, a dark costal spot beyond the middle precedes others less clearly defined; the terminal portion of the wing is also much spotted with fuscous mixed with olivaceous scales which impart a greenish hue to the shining white ground-colour on which they are associated throughout with the delicate brownish fuscous reticulations; cilia whitish, with a few brownish scales intermixed. Exp. al. 34 mm. Hindwings tawny greyish, with obscure greyish fuscous mottlings, more visible on the under than on the upper side. Abdomen brownish grey (discoloured). Legs pale cinereous.

Type ♀ (26334) Mus. Wlsm.

Hab. Molokai: 5. viii. 1893. Unique.

In the absence of the ♂ this species cannot be referred with certainty to the genus *Archips*.

46. PANAPHELIX, gen. nov.

(πᾰνᾰφῆλιξ = removed from friends.)

Type *Panaphelix marmorata*, Wlsm.

Antennae, ♂ strongly bipectinate 5—6, each pectination biciliate; ♀ shortly biciliate. Palpi porrect, extending more than the length of the head beyond it, median joint roughly clothed above, terminal joint depressed, fully half the length of the median. Head somewhat rough above and in front. Thorax smooth. Forewings with the costa evenly arched, ♂ without a costal fold, apex slightly depressed, termen scarcely sinuate, obliquely convex: neuration 12 veins, all separate; 7 to termen. Hindwings spotted, broader than the forewings, strongly sinuate below the apex: neuration 8 veins; 3 and 4 connate, 5 slightly approximating to 4 at origin, 6 and 7 separate but approximating towards base. Abdomen, ♂ slender; ♀ moderate. Legs smooth, spurs very long, the inner one of the first pair conspicuously longer than the outer.

This genus is most nearly allied to *Dipterina*, Meyr., from which it differs essentially in the strongly bipectinate antennae.

392. (1) *Panaphelix marmorata*, sp. nov. (Pl. XI. figs. 15—16).

Antennae, ♂ brownish cinereous; ♀ pale cinereous, the basal joint reddish orange. Palpi, ♂ orange ochreous, clouded at the sides and across the terminal joint with brown; ♀ reddish orange, ferruginous externally. Head, ♂ orange ochreous; ♀ yellow. Thorax, ♂ mixed reddish orange and brown; ♀ reddish orange, mixed with golden yellow. Forewings, ♂ dark brown, with reddish orange and white reticulated patches; from the costa at one-fourth a band of white runs obliquely outward to the middle of the cell, whence it reverts to the dorsum at a right angle, this is interrupted on its upper half by two lines and one or two spots of rich reddish orange, its lower half being almost entirely suffused with the same colour; between this and the base the rich brown ground-colour is blotched with reddish orange and whitish reticulations, with a short interrupted white streak along the base of the median vein; beyond this angulated basal patch are two costal spots of reddish orange mixed with white, a post-median costal patch, white reticulated with reddish orange and nucleated with brown on the margin, and two or three small costal spots towards the apex; below the outer end of the fold are some obscure reddish orange spots, followed by a large reniform patch above the tornus, white reticulated with reddish orange, some reddish orange spots along the termen are preceded by an elongate white patch reaching to the apex, much reticulated with reddish orange; cilia brown: ♀ golden yellow, reticulated with reddish orange, with bands of rich ferruginous; a ferruginous costal spot near the base is followed by a dark fuscous dot below and beyond it; an outwardly angulated narrow ferruginous band indicates the outer edge of a basal patch at one-fourth and contains a few fuscous scale-spots; it is followed by a small triangular ferruginous dorsal spot before the middle which is separated by a short space from a broad ferruginous band extending obliquely outward to the costa before the apex, sending from the end of the cell a strong branch, parallel with the basal patch, reaching the costa before the middle, two ferruginous costal spots lying between these branches; at the end of the cell, in the ferruginous band, is a small dark fuscous scale-patch, from the costa, at the extremity of the ferruginous band, a narrower band of the same colour containing several dark fuscous spots descends parallel with the termen nearly to the tornus; the veins throughout are indicated by reddish orange lines; cilia reddish orange; underside canary-yellow, especially around the margins, the dark markings of the upper side indicated by clouds of tawny grey. Exp. al. ♂ 32—37; ♀ 32 mm. Hindwings, ♂ bone-grey, with darker mottlings showing through them: ♀ shining, bone-white, with greyish fuscous spots and mottlings, of which one beyond the end of the cell is specially conspicuous; underside canary-yellow around the margins, the remainder of the wing pale straw colour, the markings more conspicuous than on the upper side. Abdomen, ♂ and ♀ bone-grey. Legs, ♂ bone-grey, tinged with ochreous; ♀ inclining to ochreous.

Type ♂ (26537); ♀ (26525) Mus. Wlsm.

HAB. MAUI: Haleakala, 5000 ft., (♀) IV. 1894, 6000 ft., (♂) IV. 1894, 5000 ft., (♂) X. 1896. Three specimens.

The ♀ was at first described as distinct under the name *chrysochroa*, and should it be proved to represent a constant form of variation, or to belong to another closely allied species, this name may be applied to it.

Panaphelix (?) sp.?

HAB. HAWAII: Mt. Kilauea, IX. 1895, ♀ (27377) Mus. Wlsm.

A single specimen in poor condition is most probably the ♀ of a smaller species (Exp. al. 23 mm.) of *Panaphelix*, but it would be rash to describe it from such material.

47. DIPTERINA, Meyr.

Type *Dipterina imbriferana*, Meyr. (Meyr. 1882).

DIPTERINA, Meyr., Pr. Lin. Soc. NSW. VI. 523—4 (1881): NZ. Jr. Sc. I. 277 (1882): Tr. NZ. Inst. XV. 54 (1883).

393. (1) *Dipterina fulvosericea*, sp. nov. (Pl. XI. figs. 17—18).

Antennae, ♂ biciliate 1, pale buff-brown, with a series of small fuscous dots above to half their length, a large fuscous spot beneath the basal joint: ♀ biciliate 1, tawny fuscous, or as in the ♂. Palpi, ♂ projecting twice the length of the head beyond it, terminal joint scarcely one-third the length of the median; brownish ochreous, with a dark brown shade along the outer side of the median joint: ♀ extending nearly thrice the length of the head beyond it, the median joint densely and closely clothed above and beneath, terminal joint naked, half the length of the median; tawny fuscous. Head tawny fuscous. Thorax, ♂ greyish fuscous, tegulae buff-brown; ♀ tawny fuscous, with a slight purplish gloss. Forewings, ♂ brownish ochreous on the costal half towards the base and on the terminal portion, elsewhere shaded with tawny greyish fuscous; a large irregular, reduplicated, trapezoidal dark tawny blotch commencing at the base below the fold reaches beyond the middle of the cell, it is deeply incised above, about its middle, a whitish cinereous line separating the incised portion from the paler ground-colour, its lower margin less clearly defined than its upper and outer margins, the latter also bounded by a pale cinereous line; the outer half of this blotch is square and abruptly terminated on the upper edge of the cell, where it is narrowly separated from a slightly inverted ovoid costal spot of the same colour, also narrowly margined with pale cinereous; this spot is preceded by an outwardly oblique dark costal streak and followed by four small square dark costal spots, the outer two of which are connected with a small tessellated dark patch below them; at the end of the cell is another square tesselated patch, margined before and behind with pale cinereous, up to the outer edge of which the pale brownish ochreous terminal area encroaches upon the darker colouring which precedes it; a few greyish fuscous mottlings occur along the lower half of the termen, with a single rounded spot opposite to its middle; cilia brownish ochreous; under side with the costa and termen much mottled: ♀ dark tawny sericeous, irrorated with pale cinereous, with two dark fuscous angular blotches; one on the dorsum near the base, furcate on the fold, its outer margin within the fork indicated by a line of pale cinereous scales; a second extending from the fold to the upper edge of the fold before the middle, trapezoidal, its base broader than its apex, its lower internal angle somewhat produced, touching the fold, this is margined before and behind by pale cinereous lines; along the costa are six dark fuscous spots, of which the first only is before the middle and is obliquely produced inwards, obtusely rounded at its apex and margined by a pale cinereous line; there is also a small dark fuscous spot at the extreme base of the costa and some fuscous mottling is visible between the end of the cell and the tornus; the costa is much arched near the base, the termen slightly sinuate below the apex; cilia tawny fuscous; underside with the costal spots distinct. Exp. al. ♂ 28; ♀ 32—36 mm. Hindwings, ♂ brownish grey, with brownish ochreous cilia, blending into brownish grey towards the flexus; underside much mottled: ♀ broader than the forewings, brownish cinereous, with slight greyish fuscous mottling showing through from the underside on the costal half. Abdomen brownish cinereous. Legs pale cinereous, with four darker tarsal bands above.

Type ♂ (25165) *Molokai*; ♀ (26801) *Kauai*, Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (♀) VI. 1894.—MOLOKAI: 3500 ft., (♂) 17. VI. 1893.—LANAI: above 2000 ft., (♂) I. 1894, 2000 ft., (♀) II. 1894.—OAHU: NW. Koolau Range, VII. 1901. Five specimens.

48. TORTRIX, L.

Type *Phalaena Tortrix viridana*, L. (Stph. 1829).

TORTRICES, L., Syst. Nat. (ed. X.) I. 496, 530—2 (1758). TORTRIX, Toern., Diss. Acad. Upsal. III. 259 (1801); [Hw.] Prodr. Lp. Br. 15 (1802); Stph., Cat. Br. Ins. II. 168 (1829): Ill. Br. Ent. Haust. IV. 66, 68 (1834); Hein.; Stgr.-Wk.; Fern.; Meyr. etc.; Wlsm. & Drnt., Ent. Mo. Mag. XXXIII. 39—40 (1897); Stgr.-Rbl., Cat. Lp. Pal. II. 88—90 (1901); Fern., Bull. US. Nat. Mus. **52**. 482—4 (1902).

394. (1) *Tortrix chlorocalla*, sp. nov. (Pl. XI. fig. 19).

Antennae brown. Palpi suberect, extending more than the length of the head beyond it, the terminal joint half as long as the median; dark tawny brown. Head and Thorax dark brown, the latter with some paler mottling. Forewings dark brown, approaching to fuscous along the cell and below the costa; a conspicuous, shining, whitish, outwardly oblique, cuneiform patch at one-third is broken on the costa by a small brown spot; a smaller white costal spot, similarly broken, occurs beyond the middle; beneath the costa about the base are two brilliant dark green patches, followed by a few scales of the same colour which touch the white costal patch; a series of brilliant dark metallic green patches occur along the fold as well as beneath its base, the apical and terminal area being also brilliantly spotted with dark green; cilia tawny brownish. Exp. al. 21—24 mm. Hindwings and cilia shining, pale yellowish brown. Abdomen and Legs pale yellowish brown.

Type ♀ (28042) Mus. Wlsm.

Variation.—Some specimens differ from the type in the absence of the white blotches on the forewings and in the further distribution of the metallic green patches over the area occupied by them; with these exceptions the coloration is similar.

Paratype ♀ (28629) Mus. Wlsm.

A small ♂ probably belonging to this species is somewhat worn; it possesses no white costal patches and is of a generally paler brownish hue, mottled with pale brownish cinereous, the position of the patches being indicated in this colour; the green patches are quite invisible, except at a certain angle in a strong light, they are somewhat more profusely distributed and more confluent, also, if anything more brilliantly iridescent and there is an indication of a small whitish spot at the end of the cell. Exp. al. 15 mm. The palpi are very decidedly shorter than in the ♀ ♀, especially the terminal joint, and it is possible that a closely allied species may be indicated.

Paratype ♂ (28639) Mus. Wlsm.

HAB. HAWAII: Kaawaloa (Kona), 1500 ft., (1) VI. 1892; Olaa, (1) VI. 1895, Type (♀) IX. 1896, 2000 ft., (♀♀♂) XI. 1896; Kona, 3000 ft., (1) IX. 1892. Seven specimens.

In the hindwings of both sexes a brilliant pale lilac hue is visible in sunlight, but this applies to other species and is not confined to the genus.

395. (2) *Tortrix metallurgica*, sp. nov. (Pl. XI. fig. 20).

Antennae brownish cinereous. Palpi somewhat erect, terminal joint half the length of the median; cinereous, with a fuscous shade externally at the base and before the end of the median joint and a fuscous ring around the terminal joint which is tipped with whitish. Head brown, with a projecting fringe of scales above. Thorax brownish cinereous. Forewings, costa evenly arched, termen moderately straight, apex obtusely rectangular; dark tawny brown, blotched with pale greenish ochreous, bright metallic steel-green scales being strewed over and between the blotches in broken transverse bands; the ochreous blotches prevail on the basal third of the costa, on the middle of the dorsum and in the terminal and apical regions, a small patch also occurring a little beyond the middle of the costa sending two streaks to the margin; a line of metallic spots runs parallel with the termen, and a divided fuscous blotch occurs at the end of the cell; cilia tawny greyish. Exp. al. (♂) 16—19 (♀) mm. Hindwings greyish brown; cilia slightly paler, tipped with pale cinereous. Abdomen greyish brown. Legs pale cinereous, the tarsi faintly spotted above with brownish grey.

Type ♂ (26397) *Molokai*, Mus. Wlsm.

In the ♀ which is larger, a conspicuously paler greenish white cuneiform patch runs obliquely from the costa at one-fourth to the middle of the cell and three costal streaks are visible on the apical third.

Paratype ♀ (26413) *Lanai*, Mus. Wlsm.

HAB. MOLOKAI: 3000 ft., (♂) 20. IX. 1893.—LANAI: 2000 ft., (♀) II. 1894. Two specimens.

396. (3) *Tortrix thoracina*, sp. nov. (Pl. XI. fig. 21).

Antennae dark brownish fuscous, the basal joint tipped with ochreous. Palpi, projecting more than the length of the head beyond it, the median joint hirsute above and beneath, the terminal joint obtuse, nearly half the length of the median; brownish fuscous mixed with whitish ochreous. Head brown above, hoary fuscous in front. Thorax white, shaded anteriorly with fawn-brownish. Forewings with large blotches of dark brownish fuscous mixed with shining, dark blue-grey scales, the first forming an extended dorso-basal patch, its outer edge angulated inward on the fold, its lower margin extending to the middle of the dorsum while its upper edge is separated from the costa by a whitish ochreous band in which are three or four dark brownish fuscous costal spots; this band, deflected outward to the dorsum, separates with two slight interruptions the basal patch from an even larger triangular costal patch of the same colour, also strewed with some shining, blue-grey speckles; this extends from about one-fourth from the base nearly to the apex and contains beyond the middle a shining, whitish ochreous spot, interrupted by a dark costal dot; the lower extremity of the triangle reaches to the fold where it is somewhat strewed with olive-brown; the space between this and the termen is shining, olivaceous ochreous, mottled with whitish, containing two curved transverse bands of olive-brown spots diffused and blended, the one along the termen, the other, within and parallel to it but meeting on the dorsum before the tornus; apex and cilia chequered with greyish fuscous and whitish ochreous, some small almost pure white scale-spots at their base on the middle of the termen and at the tornus. Exp. al. 26 mm. Hindwings brownish grey, the cilia on their outer half very pale greyish cinereous. Abdomen and Legs brownish grey.

Type ♀ (26871) Mus. Wlsm.

Variation.—In a small ♂, almost undoubtedly belonging to this species, the lighter markings are unaccompanied by white scaling and are decidedly of a browner hue; the first pale costal blotch is strongly interrupted above the fold by the outward diffusion of the basal patch which, after reaching the end of the cell, is attenuated to the tornus. Exp. al. 21 mm. The antennae are slightly serrate, with very short ciliations. The thorax is dark brownish fuscous with pale brownish anterior and posterior margins.

Paratype ♂ (27679) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (♂) IV. 1895; Mts., 3000—4000 ft., (♀) VI. 1894. Two specimens.

397. (4) *Tortrix* (?) *falerniana*, sp. nov. (Pl. XI. fig. 22).

Antennae dark tawny purplish. Palpi projecting more than the length of the head beyond it, somewhat triangular, with a close thick-set brush along the upper surface of the median joint, terminal joint somewhat short, smooth; dark tawny. Head and face somewhat rough; dark tawny. Thorax dark tawny, with a purplish vinous tinge posteriorly. Forewings with the costa slightly arched, obliquely ascending at the base, straight beyond, the termen scarcely oblique, not sinuate; shining, purplish vinous, with faint tawny reticulations, a series of small triangular tawny ferruginous costal spots, an oblique tawny ferruginous fascia descending narrowly from the costa at one-third, dilated on the lower half of the cell to its outer end and thence again restricted to the dorsum beyond the middle; an inwardly biangulated band of the same colour precedes the termen and is furcate to the dorsum before the tornus; cilia brownish. Exp. al. 25 mm. Hindwings with veins 6 and 7 distinctly stalked; grey, with darker spots and mottlings showing through them; cilia grey, with a slight vinous tinge. Abdomen [missing]. Legs cinereous, with grey tarsal bands.

Type ♀ (26076) Mus. Wlsm.

HAB. MOLOKAI: 4000 ft., 22. V. 1893. Unique.

398. (5) *Tortrix* (?) *capucina*, sp. nov. (Pl. XI. fig. 23).

Antennae pale fawn. Palpi projecting more than the length of the head beyond it, median joint thickened with dense scales above, terminal joint short; deep chocolate-brown, paler on their inner sides. Head and Thorax deep chocolate-brown, the face and tegulae pale fawn. Forewings pale fawn, with an elongate triangular dark chocolate-brown costal patch commencing before the middle and reaching nearly to the apex; a dark chocolate dorsal spot near the base, connected with the base by scales of the same colour, and two small costal spots above it; a number of minute chocolate-brown dots are scattered over the terminal portion of the wing from beyond the middle of the dorsum nearly to the apex—in all these chocolate dots, as in the costal patch, there is a slight admixture of tawny reddish scales; cilia brownish ochreous, containing a few tawny spots below the apex. Exp. al. 24 mm. Hindwings pale bone-grey, with darker specklings showing through them, cilia with a slight ochreous tinge. Abdomen fawn-brownish. Legs pale bone-grey, the tarsi with four brown bands.

Type ♀ (26358) *Molokai*, Mus. Wlsm.

Hab. Molokai: 4000 ft., 23. ix. 1893.—Hawaii: Kona, 3000 ft., vi. 1892. Two specimens.

This species has much the appearance of an *Oxygrapha*, but the neuration, although utterly abnormal in the left forewing of the type (14 veins; 2 and 11 both outwardly furcate, the latter from a narrow supplementary cell; 3 and 4 connate; 8 furcate at base, one fork connate with 7, the other connected with 9 near its origin) proves it distinct from that genus.

399. (6) *Tortrix rubiginis*, sp. nov. (Pl. XI. fig. 24).

Antennae brownish cinereous. Palpi hoary whitish, shaded with greyish fuscous externally. Head hoary white. Thorax hoary, mixed with fuscous. Forewings white, much smeared and banded with greyish fuscous on which are spots and streaks of dark fuscous, tending, especially on the costal half of the wing, to define the form of the clouded markings; these, although more or less blending, show a short basal patch divided by a narrow ferruginous basal streak; a triangular costal patch reaching to one-third from the base, indistinctly produced to the fold; a larger costal patch reaching to two-thirds, produced obliquely outward and recurved to the dorsum before the tornus; and an anteapical costal shade produced inward to the end of the cell and traversed by two darker streaks accompanied by rust-brown scales; a rust-brown spot lies at the end of the cell and some scales of the same colour are visible on the disc and below the middle of the fold; cilia hoary greyish. Exp. al. 18 mm. Hindwings and cilia pale brownish cinereous. Abdomen pale brownish cinereous. Legs [missing].

Type ♂ (28668) Mus. Wlsm.

Hab. Oahu: Waianae Mts., (Type) ii. 1896; NW. Koolau Range (♂♀) vii. 1901. Three specimens.

49. Capua, Stph.

CAPUA, Stph., Ill. Br. Ent. Haust. IV. 171 (1834); Wilk., Hein., Stgr.-Wk., etc., Meyr., HB. Br. Lp. 527—8 (1895).
= *TERATODES*, Gn., Ann. Soc. Ent. Fr. XIV. (2. s.) III 168 (1845): Ind. Meth. 34 (1845).
= *BATODES*, Gn., Ann. Soc. Ent. Fr. XIV. (2. s.) III. 174 (1845): Ind. Meth. 40 (1845). Hein., Stgr.-Wk., etc. = *HOMONA*, Wkr., Cat. Lp. Ins. BM. XXVIII. 424 (1863).

400. (1) *Capua* (?) *flavopicta*, sp. nov. (Pl. XI. fig. 25).

Antennae brownish ochreous, faintly banded with pale brown above. Palpi very short; brownish ochreous. Head brownish, face paler. Thorax canary-yellow, smeared with brownish along the middle. Forewings canary-yellow, mottled with rich chestnut on a short oblique basal patch, narrower on the costa than on the dorsum and containing two or three groups of shining, dark steel-grey scales; a short costal streak, also obliquely placed before the middle, is rich chestnut; on the outer half of the dorsum arises a large triangular dark chestnut-brown patch, narrowly margined by a rich paler chestnut, its outer edge running parallel with the termen and reaching nearly to the apex; this is illuminated by patches of shining, dark steel-grey; termen and cilia canary-yellow, tornal cilia dark grey. Exp. al. 18 mm. Hindwings pale brownish aeneous, lighter towards the costa; cilia greyish, becoming pale yellowish towards the termen. Abdomen light brownish. Legs creamy whitish.

Type ♀ (26791) Mus. Wlsm.

Hab. Kauai: Mts., 3000—4000 ft., v. 1894. Unique.

Although the pattern of the colouring is very different there is great similarity in the colouring itself between this species and *Capua picta*, of which ♂♂ only have been received. With the material before me I do not feel justified in uniting them as sexes of one species.

401. (2) *Capua picta*, sp. nov. (Pl. XI. fig. 26).

Antennae, ♂ biserrate; brownish ochreous. Palpi very short, not projecting beyond the head, the terminal joint almost concealed in the obtusely tufted median joint; pale ochreous on their inner sides, chestnut-brown externally. Head brownish ochreous. Thorax cream-yellow, mixed with chestnut. Forewings with the costa arched before the middle, straight beyond, termen oblique, not sinuate, ♂ with a well-developed costal fold; rich chestnut-brown with pale cream-yellow patches, these commencing at the base are scattered obliquely outward from the costal fold to near the dorsum, before the middle, to the number of four or five, two nearer the base, three beyond it (including the outer half of the costal fold as one); beyond this a triangular costal patch is more conspicuous and the cream-yellow occurs again along the termen including the cilia, except at the tornus where they are grey; the chestnut-brown colour shows a tendency to become brighter around the edges of the pale markings, but on the central portion they are illuminated by lines of shining, steel-grey scales. Exp. al. 16 mm. Hindwings greyish, with an aeneous tinge. Abdomen greyish. Legs whitish.

Type ♂ (26771) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (1) IV. 1895; Mts., 3000—4000 ft., (2) V. 1894, (1) VI. 1894. Four specimens, all ♂♂.

402. (3) *Capua* (?) *flavocincta*, sp. nov. (Pl. XI. fig. 27).

Antennae yellowish, barred above with fuscous. Palpi yellow, the median joint orange on its outer side. Head and Thorax yellow, the latter becoming fuscous posteriorly, the tegulae streaked with bright orange. Forewings tawny, with a purplish grey metallic suffusion, condensed into purplish fuscous along the inner and outer margins of a broad triangular bright orange costal patch which extends from before the middle nearly to the apex; the extreme base and the costa near the base are also touched with orange and a diffused orange band extends from the apex along the termen before the base of the yellow cilia. Exp. al. 18 mm. Hindwings pale grey; cilia pale yellowish. Abdomen pale brownish cinereous. Legs very pale cinereous.

Type ♀ (25182) Mus. Wlsm.

HAB. HAWAII: Kona, 4000 ft., IX. 1892. Unique.

403. (4) *Capua trigonifer*, sp. nov. (Pl. XI. fig. 28).

Antennae yellowish, the basal joint orange-ochreous beneath. Palpi yellow on their inner sides, orange-brown externally. Head pale yellow. Thorax yellow, with a ferruginous patch posteriorly; a patch of rich orange-ochreous at the base of the tegulae. Forewings rich ferruginous, a small yellow patch at the extreme base below the edge of the costal fold (♂), which is rich reddish orange on its basal and yellowish ochreous on its outer half; two pale yellowish ochreous patches occur beyond the middle, separated and bounded beneath by rich reddish orange which separates their lower extremities from a shining, white triangular patch at the end of the cell, its apex extending to the tornal angle of the cell; on the orange division between the two costal patches is a dark, shining, steel-grey metallic spot, a series of similar spots irregularly distributed obliquely across the wing from the middle of the costa to near the tornus as also about the apical and tornal portion; cilia with a yellowish ochreous tinge along the termen, greyish about the tornus. Exp. al. 12 mm. Hindwings and cilia brownish cinereous. Abdomen fawn-brownish. Legs whitish.

Type ♂ (25181) Mus. Wlsm.

Hab. Hawaii: Kona, 4000 ft., ix. 1892. Unique.

It is possible that a bred series might prove *trigonifer* and *flavocincta* to be sexes of one species, but this would be a rash assumption on the evidence afforded by two specimens so different in appearance.

404. (5) *Capua pleonectes*, sp. nov. (Pl. XII. fig. 1).

Antennae biciliate in ♂; pale ochreous, banded above with fuscous. Palpi projecting about the length of the head beyond it; dull ochreous, the short terminal joint fuscous. Head and Thorax dull ochreous. Forewings rather shining, ochreous, slightly mottled with brownish ochreous, the broad costal fold of the ♂ brown at the base with fuscous scales intermixed; a basal patch below it, throwing out a median angle to about one-fourth, is mixed brownish ochreous and tawny fuscous; below the outer end of the costal fold, a little before the middle, commences an outwardly oblique tawny fuscous transverse fascia, gradually dilated outward to the dorsum about the tornus and connected with a fuscous spot on its outer side at the end of the cell; on this fascia are some spots of rather shining, leaden grey scales, as also on the diffused tawny fuscous terminal shade; cilia pale greyish fuscous below the apex, ochreous above it. Exp. al. 21 mm. Hindwings brownish grey, with some darker reticulations showing through from the underside; cilia whitish cinereous, shaded along their base. Abdomen cinereous, the anal tuft inclining to ochreous. Legs pale cinereous.

Type ♂ (28070) Mus. Wlsm.

The ♀ is much larger than the ♂ and varies from pale chestnut-brown to dark chestnut-brown sprinkled with shining, purplish scales; in the darker specimen is an ochreous semi-lunate dorsal patch, but the paler variety is practically unicolorous with the exception of a tawny fuscous patch in the tornal cilia, the median fascia scarcely indicated in either specimen. Exp. al. 26—28 mm.

Co-types ♀♀ (28065, 28066) Mus. Wlsm.

Hab. Hawaii: Mt. Kilauea, viii. 1896. Six specimens.

405. (6) *Capua castaneana*, sp. nov. (Pl. XII. fig. 2).

Antennae brownish cinereous, banded above with fuscous. Palpi reddish brown, tipped with fuscous. Head brown, the face darker. Thorax brown, anteriorly greyish fuscous above, the tegulae chestnut-brown tipped with white. Forewings chestnut-brown, with slight brownish ochreous mottling and some rather shining, blue-grey transverse lines towards the apex, and on an ill-defined oblique darker central fascia and costal shade; a distinct fuscous spot at the end of the cell, with about four less distinct costal spots above it, alternating with paler spots between them ; a broken line of white streaks, commencing about the middle of the costal fold, runs obliquely inward toward the base of the dorsum ; a few white specks are visible on the extreme dorsum which is very narrowly dark fuscous ; cilia chestnut-brown, somewhat paler than the wings (by a slight admixture of brownish ochreous), tornal cilia dark greyish fuscous. Exp. al. 21 mm. Hindwings tawny grey, profusely mottled with a darker shade throughout, owing to spots on the underside showing through them ; cilia pale cinereous, with a reduplicated darker shade running through them. Abdomen tawny grey, anal tuft brownish ochreous. Legs cinereous, with grey lateral bands on the tibiae and tarsi.

Type ♂ (27201) Mus. Wlsm.

The ♀ is distinctly paler, inclining to fawn-ochreous, with the ferruginous shading confined to a faintly indicated basal patch, an oblique fasciaform band, somewhat interrupted towards the tornus, and a slight subapical reticulation. Exp. al. 22 mm.

Type ♀ (28027) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., (♂) VI. 1894; Lihue, 4000 ft., (♂♀) VII. 1896. Three specimens.

406. (7) *Capua* (?) *glaucoviridana*, sp. nov. (Pl. XII. fig. 3).

Antennae cinereous, banded with fuscous above, the bands connected along their middle on the basal half. Palpi fuscous, externally tipped with pale cinereous. Head brownish cinereous. Thorax fuscous, sprinkled with cinereous. Forewings pale greenish cinereous, with reticulate broken patches of dark olivaceous brown ; a basal patch, outwardly angulated in the middle, a broken transverse oblique fascia from the middle of the costa to the tornus, with some green scales at the end of the cell and on the fold, a triangular costal patch at one-third from the apex and a terminal patch before the tawny grey cilia. . Exp. al. 16 mm. Hindwings and cilia tawny greyish. Abdomen tawny greyish. Legs dirty whitish.

Type ♀ (27681) Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., IV. 1895. Unique.

407. (8) *Capua variabilis*, sp. nov. (Pl. XII. fig. 4).

Antennae biciliate in the ♂; cinereous, banded above with fuscous. Palpi projecting more than the length of the head beyond it ; with the median joint somewhat arched, thickly clothed above, and with a slight tuft projecting beneath the terminal joint which is less than half its length ; brownish, the terminal joint darker, its apex paler. Head somewhat rough above ; brownish. Thorax not tufted ; brownish fuscous, mottled with paler scales. Forewings, with the costa evenly arched, ♂ with a strong cuticular fold at the base, termen slightly convex and slightly oblique; exceedingly variable in colour, the prevailing tints being hoary or greenish grey, with umber-brown or brownish fuscous suffusion; sometimes almost divided into an oblique basal patch, an oblique central fascia, and a terminal shade; sometimes obliterating the paler ground-colour over the whole dorsal or terminal half or two-thirds of the wing-surface: [Var. A] the pale green-grey ground-colour, speckled with brownish fuscous, forms an oblique band between the irregularly angulated basal patch and the central fascia and reappears between this and the apical suffusion but does not reach the termen which is also completely suffused in conjunction with the central fascia at the tornus where only a few greenish scales are visible, there are also two or three small pale costal spots before the apex; cilia brownish fuscous. Exp. al. (♂) 20—28 (♀) mm. Hindwings and cilia tawny brownish. Abdomen tawny brownish. Legs cinereous, with tawny brown shades and tarsal blotches.

Type ♂ (26312) *Molokai*, Mus. Wlsm.

Var. B: the whole wing-surface is suffused with brownish fuscous, bedewed with shining, tawny bluish mottling, the hoary whitish ground-colour showing only in three costal patches, each interrupted by a dark spot on the margin, and in one smaller patch at the apical angle of the cell.

Paratype ♀ (26563) *Maui*, Mus. Wlsm.

Var. C: the basal patch is bounded by an oblique white band, dilated towards the dorsum and interrupted by a dark costal dot; there is also a pale patch on the middle of the costa interrupted by a dark spot, with three smaller pale costal spots beyond it, a small white spot also lies at the end of the cell.

Paratype ♂ (26566) *Maui*, Mus. Wlsm.

Var. D: the pale markings are scarcely traceable, but are situated as in Var. C, although extending across the basal patch to the dorsum.

Paratype ♂ (26385) *Molokai*, Mus. Wlsm.

Var. E: the ground-colour is pale buff-brown and the darker markings are much mixed with rich chestnut-brown, especially visible on the upper halves of the basal patch and central fascia and in a costal patch at the outer third as well as in the apical cilia; the central fascia is connected at the tornus with the terminal suffusion which extends to the apex; there is a distinct dark tawny fuscous spot at the posterior extremity of the thorax, but I can see no sufficient ground for separating this specimen from those above described although its general colour and appearance is somewhat dissimilar.

Paratype ♀ (26359) *Molokai*, Mus. Wlsm.

HAB. MOLOKAI: 4000 ft., (1) 23. V. 1893, (2) VI. 1896, (1) 17. IX. 1893, above 4500 ft., (1) 11. IX. 1893, (3) 23. IX. 1893; Kahanui, (1) 11. VIII. 1893.—MAUI: Haleakala, 5000 ft., (3) III. 1894, (5) X. 1896; Olinda (Haleakala), 4000 ft., (1) IV. 1894. Eighteen specimens.

408. (9) *Capua ochreocuprea*, sp. nov. (Pl. XII. fig. 5).

Antennae shortly biciliate; pale cinereous, transversely banded about with fuscous. Palpi projecting the length of the head beyond it, somewhat triangular; dull cinereous. Head and Thorax dull cinereous. Forewings reddish brown, blotched or mottled indistinctly with shades of dark brownish ochreous and suffused with a thick sprinkling of shining, olivaceous grey scales arranged in transverse lines towards the apex, the broad costal fold in the ♂ having a somewhat richer tint than the wing-surface, tending to chestnut-brown: in Var. A a strong snow-white spot lies at the tornal angle of the cell (this is absent in Var. B, in which the brownish ochreous mottling is more distinctly visible in a large dorsal patch and on the outer end of the fold as well as towards the apex, the intermediate spaces inclining to tawny fuscous and therefore decidedly darker than the reddish brown of Var. A); the cilia correspond with the darker shade in each case, but are tipped with ochreous along the middle of the termen. Exp. al. 18—19 mm. Hindwings (in both varieties) pale brownish ochreous, margined and slightly speckled with a darker tawny shade; cilia brownish ochreous, with a dark tawny shade running through them. Abdomen brownish ochreous. Legs whitish ochreous.

Type ♂ (26931); Paratype Var. B ♂ (26710) Mus. Wlsm.

The ♀ is larger than the ♂, and shows the tawny fuscous tinge of Var. B in an oblique basal patch, not well-defined and connected along the costa with a narrow oblique transverse fascia which is also connected at both extremities with a broad apical and terminal shade of the same colour, the intermediate spaces dull brownish ochreous; the hindwings are also somewhat more broadly margined than in the ♂. Exp. al. 25 mm.

Type Var. B ♀ (27264) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., VI. 1894. Seven specimens.

409. (10) *Capua fulva*, sp. nov. (Pl. XII. fig. 6).

Antennae, Palpi and Head tawny fuscous. Thorax dark tawny fuscous. Forewings dark tawny fuscous; on the costa, commencing at the middle, is a dark brownish ochreous triangular blotch reaching nearly to the apex, nucleated with dark tawny fuscous on the margin; at its lower angle a small snow-white spot with a larger one below it at the tornal angle of the cell; some rather shining, grey scales are bestrewed over the basal and terminal portions of the wing; cilia tawny, with a slight cupreous gloss. Exp. al. 20 mm. Hindwings unicolorous brownish cupreous; cilia pale cinereous. Abdomen brownish cupreous. Legs pale cinereous.

Type ♂ (27012) Mus. Wlsm.

Var. B with the costal blotch and white spots absent. Paratype ♂ (27263) Mus. Wlsm.

Hab. Kauai: Kaholuamano, 4000 ft., (1) iv. 1895; Mts., 3000—4000 ft., (2) vi. 1894. Three specimens.

It is not impossible that these may be varieties of *Capua ochreocuprea*, but the unicolorous dark hindwings appear to separate them.

50. Epagoge, Hb.

Type 1. *Pyralis grotiana*, F. (Stph. 1834).

epagoge, Hb., Verz. bek. Schm. 389 (1826); Stph., Ill. Br. Ent. Haust. iv. 79—80 (1834), 420 (1835); Meyr., HB. Br. Lp. 527 (1895).
= *dichelia*, Gn., Ann. Soc. Ent. Fr. xiv. (2. s.) iii. 141 (1845): Ind. Meth. 7 (1845); Stph., List. Br. An. BM. x. Lp. 9 (1852); Wilk., Ld., Hein., Stgr.-Wk., etc.

Type 2. *Hastula hyerana*, Mill.

= *hastula*, Mill., Ann. Soc. Ent. Fr. xxvi. (3. s.) v. 799—802 (1858).

410. (1) *Epagoge infaustana*, sp. nov. (Pl. XII. fig. 7).

Antennae cinereous, faintly banded above. Palpi short and stout, with the terminal joint depressed; dark brownish. Head and Thorax dark cinereous, the latter with a bluish gloss. Forewings dark cinereous, with a bluish gloss and some brownish cupreous transverse strigulae across the basal third and a slight cupreous sheen about the termen and tornus; an outwardly angulated basal patch is faintly indicated by a line a little darker than the ground-colour, and is followed by a rather more clearly defined median fascia, also bowed outwards and narrowly dark-margined; at two-thirds from the base a narrow darkened line, much bent outward from the costa and recurved to within the tornus, cuts off the terminal and apical portion of the wing which is faintly reticulate, with a cupreous sheen; cilia mixed with bluish grey and cupreous. Exp. al. (♂) 12—14 (♀) mm. Hindwings and cilia shining, pale greyish. Abdomen pale cinereous. Legs bone-whitish, the tarsi faintly mottled.

Type ♀ (26945); ♂ (26843) *Kauai*, Mus. Wlsm.

Hab. Kauai: Kaholuamano, 4000 ft., (2) iv. 1895; Mts., 3000—4000 ft., (7) v. 1894, (4) vi. 1894.—Molokai: above 3000 ft., (1) 24. vi. 1893.—Maui: Haleakala, 5000 ft., (1) v. 1896.—Hawaii: Mt. Kilauea, (1) vii. 1895, (3) viii. 1896; Olaa, (1) vii. 1895; Kona, above 2000 ft., (4) excl. ix. 1892; Olaa, 2000 ft., (3) xi. 1896. Twenty-seven specimens.

There is some pale mottling on the costa on the underside of the forewings, and the underside of the hindwings is delicately reticulate with darker grey on their outer half. In the ♂ the markings are sometimes of a paler colour and consequently appear more distinct.

411. (2) *Epagoge* (?) *xanthogona*, sp. nov. (Pl. XII. fig. 8).

Antennae chocolate-brown, with faint pale annulations toward the base. Palpi very short, not projecting beyond the head; chocolate-brown, with a few pale scales at their outer extremity. Head chocolate-brown. Thorax dark chocolate-brown, tegulae pale straw-yellowish. Forewings dark chocolate-brown, pale straw-yellowish along the costa to one-fourth from the base, with a slight indication of a dark chocolate band forming the outer edge of a short outwardly angulated basal patch, beyond which a slight admixture of brownish ochreous scales makes the basal third to the dorsum somewhat paler than the outer portion of the wing; in the dark outer portion is a conspicuous triangular pale yellowish costal patch; cilia rusty brown, tinged with yellowish on their outer half. Exp. al. 14 mm. Hindwings chocolate-brown; cilia scarcely paler. Abdomen dark chocolate-brown. Legs brownish cinereous.

Type ♀ (25358) Mus. Wlsm.

Hab. Hawaii: Kona, 4000 ft., vii. 1892, 5000 ft., 4. vii. 1892. Two specimens.

412. (3) *Epagoge* (?) *pernitida*, sp. nov. (Pl. XII. fig. 9).

Antennae cinereous, neatly banded above with fuscous. Palpi extending the length of the head beyond it; olivaceous ochreous. Head dull olivaceous ochreous. Thorax dark greyish. Forewings pale olivaceous ochreous on the outer half, shaded with olive-brownish in an oblique fascia across the middle, the basal third shining, silvery grey; the basal area possesses a chestnut-brown patch at the base of the costa, succeeded by a minute chestnut costal spot, and the silvery metallic gloss is tinted towards the base with lilac, and mottled with olive-brownish along the dorsum; the oblique clouded fascia is chestnut-brown on the costa, fading to olive-ochreous upon the disc and darkened again to olive-brown thence to the dorsum, where it is outwardly bounded by a patch of shining, lilac-grey scales, a streak of shining, silvery grey beyond it pointing upward and outward to the tornus; a similar silvery streak, outwardly oblique, bounds the costal extremity of the central fascia, and is itself bounded externally on the costa by a small chestnut shade; terminal cilia at their base bright chestnut, on their outer half whitish, a small fuscous spot at the tornus. Exp. al. 17 mm. Hindwings dull greyish brown; cilia becoming pale brownish cinereous on their outer half. Abdomen and Legs greyish brown; the tarsi with faint pale annulations.

Type ♀ (28641) Mus. Wlsm.

Hab. Hawaii: Olaa, 2000 ft., xi. 1896. Unique.

A single ♂ (28616) in very poor condition, taken at Hilo, 2000 ft., i. 1896, is closely allied to *pernitida*.

413. (4) *Epagoge* (?) *argentinotata*, sp. nov. (Pl. XII. fig. 10).

Antennae brownish fuscous, paler beneath. Palpi chestnut-brown. Head and Thorax chestnut-brown. Forewings rich chestnut-brown, fading into a paler tint, partially suffused with steel-grey scales about the base of the cell and below the fold; on the costa near the base is a spot of bright steel-grey scales, almost immediately followed by a broad yellowish silvery band, attenuated somewhat obliquely outward and abruptly terminated on the fold; a little beyond the middle is a short and narrower oblique silvery costal patch, a minute costal spot appearing before the apex and another at the tornal angle of the cell; at the tornus is an erect attenuate steel-grey streak; cilia yellowish silvery, touched with chestnut-brown at the apex and near the tornus. Exp. al. 16—17 mm. Hindwings and cilia brownish grey. Abdomen and Legs brownish grey.

Type ♀ (27514) Mus. Wlsm.

HAB. HAWAII: Olaa, VI. 1895; Hilo, 2000 ft., I. 1896. Two specimens.

VI. TINEIDAE.

51. OPOSTEGA, Z.

OPOSTEGA, Z., Isis **1839**, 214; Meyr., HB. Br. Lp. 728, fig. (1895); Stgr.-Rbl., Cat. Lp. Pal. II. 220, No. 433 (1901), etc.

414. (1) *Opostega maculata*, sp. nov. (Pl. XXV. fig. 12).

Antennae greyish; eye-caps white. Head white. Thorax tinged with grey. Forewings shining, cream-white, a grey dorsal patch at the base is followed by a mixed brown and greyish outwardly oblique patch about the middle of the dorsum, its outer extremity opposite to a short outwardly oblique brownish costal spot beyond the middle; before the apex are two slender dark brown and grey costal streaklets meeting on a small blackish apical spot from which another streaklet runs outward through the subapical cilia; cilia white, shading to grey on the dorsum; underside with a naked space towards the base. Exp. al. 8 mm. Hindwings and cilia pale brownish grey. Abdomen brownish grey above, whitish beneath. Legs grey.

Type ♂ (26184) Mus. Wlsm.

HAB. MOLOKAI: above 3000 ft., 30. V. 1893. Unique.

415. (2) *Opostega dives*, sp. nov. (Pl. XXV. fig. 13).

Antennae fuscous; eye-caps silvery white. Head yellowish, shading to grey posteriorly. Thorax iridescent, coppery. Forewings dark iridescent bottle-green, with a rich iridescent coppery gloss beyond the middle; apical cilia greyish, with three pale fuscous streaklets radiating upward from a dark fuscous apical spot which has also a curved fuscous line on its outer side; tornal and dorsal cilia greyish fuscous, with a coppery sheen along their base; underside with a naked patch towards base. Exp. al. 11 mm. Hindwings and cilia dark tawny brownish grey. Abdomen fuscous. Legs greyish fuscous.

Type ♂ (27570) Mus. Wlsm.

HAB. KAUAI: Halemanu, 4000 ft., v. 1895. Two specimens.

The hairs on the hind legs are longer and scarcely so bristly as in *maculata* and other species of this genus, but it agrees in neuration and general structure.

52. OPOGONA, Z.

n. synn. =§ *LOZOSTOMA*, Stn.; =CACHURA, Wkr.

Type 1. *Opogona dimidiatella*, Z. (Z. 1853).

OPOGONA, Z., Bull. Soc. Imp. Nat. Mosc. XXVI. (2), 504—7, Pl. IV. 13—16 (1853).

1 (Type) *dimidiatella*, Z.

Stgr., Berl. Ent. Zts. XIV. 325 (1870); Stgr-Wk., Cat. Lp. Eur. 335, No. 300 (1871); F. & R., Reise Nov. Lp. v. expl. Pl. 139. 8 (1875); Moore, Lp. Ceyl. III. 526 (1887); Swinh. & Cotes, Cat. Moths Ind. 723 (1889); Stgr.-Rbl., Cat. Lp. Pal. II. 220, No. 432 (1901).

Type 2. *Lozostoma flavofasciata*, Stn.

†§ *LOZOSTOMA*, Stn., Tr. Ent. Soc. Lond. (n. s.) V. 124 (1859).

1 *flavofasciata*, Stn. 2 *semisulphurea*, Stn.

Wkr., Cat. Lp. Ins. BM. XXX. 1041 (1864); Moore, Pr. Z. Soc. Lond. **1867**, 671; Swinh. & Cotes, Cat. Moths Ind. 722 (1889); Meyr., Pr. Lin. Soc. NSW. XXII. 298, 415, No. 31 (1897).

[*flavofasciata*, Stn., may be taken as the type of *LOZOSTOMA* (‡ LOXOSTOMA), Stn., but this name is invalid through homonymy with LOXOSTOMA, Biv. (1838) *Moll.*]

Type 3. *Cachura objectella*, Wkr. (Wkr. 1864).

CACHURA, Wkr., Cat. Lp. Ins. BM. XXX. 918 (1864).

1 (Type) *objectella*, Wkr.

Moore, Lp. Ceyl. III. 526 (1887); Swinh. & Cotes, Cat. Moths Ind. 723 (1889).

Zeller when describing *Opogona* remarked that although at first sight *dimidiatella* appeared to be an *Elachista* allied to *modestella*, Dp. [i.e. *Asychna*, Stn.] its nearest ally was *Oenophila* V-*flavum*, Hw. Staudinger (Berl. Ent. Zts. XIV. 325) regarded *Opogona* as intermediate between *Bucculatrix*, Z. and *Phyllobrostis*, Stgr.

Staudinger and Rebel (Cat. Lp. Pal. II. 220) place *Opogona* in *Lyonetiadae* between *Bucculatrix* and *Opostega*, thus following Staudinger and Wocke (Cat. Lp. Eur. 335), but removing *Opostega* from the *Nepticulidae* to the *Lyonetiadae*.

Walker placed his genus *Cachura* at the end of the *Lyonetiadae* following *Bucculatrix*, with *Leucanthiza*, Clms., intervening.

Stainton described *Lozostoma* as one of the *Elachistidae* allied to *Cosmopteryx*, Hb., [*Lozostoma* (‡ *Loxostoma*) is invalid being homonymous with *Loxostoma*, Biv. (1838) *Moll.*]. Meyrick (Pr. Lin. Soc. NSW. XXII. 415) followed Stainton in referring *Lozostoma* to the *Elachistidae* which he defined as having "Maxillary palpi rudimentary," but *Opogona dimidiatella*, Z., and *panchalcella*, Stgr., *Lozostoma flavofasciata*, Stn., and *sterodyta*, Meyr., etc., *Cachura objectella*, Wkr., *Argyresthia* (?) *aurisquamosa*, Btl., and various Malaysian and Australian species all agree in having the maxillary palpi strongly developed and folded. It therefore follows that *Opogona*, Z. (= *Lozostoma*, Stn.) is approximately correctly located in the *Tineidae* in the neighbourhood of *Opostega*, Z., while its nearest ally is perhaps *Dendroneura*, Wlsm. (Pr. Z. Soc. Lond. **1891**, 509—10, Pl. XLI. 6) which is apparently an older and less specialised form than either *Opogona* or *Opostega*.

Opogona aurisquamosa, Btl., has been bred from sugar-cane and banana in Hawaiia and *subcervinella*, Wkr. (**n. syn.** = *plumipes*, Btl.) is noted as injurious to developed sugar-canes and in potatoes and other stored tubers in Mauritius. Unfortunately we have no exact record of the habits of either species, but van Deventer [Tijd. Ent. XLVII. 83—4, Pl. X. 1^{a-b} (1904)] figures and describes the larva of *Opogona fumiceps*, F. & R., feeding on the Kokos-palm in Java.

Meyrick [HB. Br. Lp. 728 (1895)] remarks of *Opostega* "Larva almost unknown," which sums up concisely the present state of our knowledge of this genus.

Stainton [Ent. Ann. **1868**, 133] mentions the breeding of a crippled specimen of *Opostega auritella*, Hb., from flower-stalks of *Caltha palustris* by Sleich, and Büttner [Stett. Ent. Ztg. XLI. 468, No. 2966 (1880)] records the breeding of a second cripple by Knaack from the same plant. Warren [Ent. Mo. Mag. XXV. 145 (1888)] states that he had by chance bred two specimens of *salaciella*, Tr. (these apparently fed among the flowers, or in the flower-stalks, of *Rumex acetosella*) and suggests that *crepusculella*, Z., may feed in *Mentha palustris*, and *spatulella*, HS., in the flower-stalks of Wych-elm.

416. (1) *Opogona aurisquamosa*, Btl. (Pl. XXV. fig. 14).

Argyresthia (?) *aurisquamosa*, Btl., Ann. & Mag. NH. (5. s.) VII. 403—4, No. 43 (1881)[1].

Antennae very pale fawn-ochreous (almost whitish), the basal joint somewhat dilated and flattened, whiter than the stem. Palpi pale fawn-ochreous above, straw-white beneath. Head shining, pale fawn-brown; face shining, steel-white. Thorax shining, varying from brown to deep purplish. Forewings iridescent, dark purple, varying to pale fawn-brownish (but chiefly in worn or greasy specimens), with minute transverse lines of golden scales, more noticeable towards the apex than on the basal half, these coalesce in some specimens forming a costal spot before the apex, and occasionally a dorsal spot near the end of the fold; cilia dull pale brownish ochreous, varying to grey. Exp. al. 12—14 mm. Hindwings shining, bronzy greyish, with bright aeneous sheen around the margins, silvery white on the costa about the base; cilia dull pale brownish ochreous. Abdomen shining, pale fawn-brownish, varying to dark purplish grey. Legs pale ochreous.

Type ♀ (42 : 81. 7) *Oahu*, Mus. Br. [Caenotypes ♀ (25269); ♀ (25375); ♀ (28654); ♀ (27516) Mus. Wlsm.]

HAB. HAWAIIA. KAUAI: Mts., 3000—4000 ft., VI. 1894 (Perkins).—OAHU: near Honolulu (Blackburn)[1]; Waialua (beach), III. 1892; Waianae Mts., IV. 1892, "generally on 'Kukui' trees (*Aleurites triloba*) also found on plains" (Perkins).—MOLOKAI: 12. VI. 1893; Kahanui, IX. 1893 (Perkins).—LANAI: 2000 ft., II. 1894 (Perkins).—HAWAII: Kona, 2000 ft., VI. 1892, 3000 ft., VI., IX. 1892; Kaawaloa (Kona), 1500 ft., IX. 1892; Olaa, 2000 ft., VI. 1895, XI. 1896 (Perkins).—Two specimens, determined for the US. National Museum: pale form (Drnt. Det. 4926: 1900) labelled "Larva Banana, Sandwich Ids."; dark form (Drnt. Det. 4952: 1900) labelled "from Sugar Cane, Sandwich Ids., ex 25. VIII. 1888." E. PACIFIC. MARQUESAS IS.: O-Hiva-Oa Id., 14. III. 1883 (2819, J. J. Walker).—SOCIETY IS.: Tahiti, mountain forests, about 3000 ft., 10—19. V. 1883 (2874, J. J. Walker).

53. EREUNETIS, Meyr.

= *DECADARCHIS*, Meyr.[3]

Type 1. *Ereunetis iuloptera*, Meyr.

EREUNETIS, Meyr., Pr. Lin. Soc. NSW. v. 258 (1880)[1]: Tr. NZ. Inst. XX. 92 (1888)[2]: Pr. Lin. Soc. NSW. (2. s.) VII. 480, 562—3 (1893)[3].

Type 2. *Tinea simulans*, Btl. (Meyr. 1886).

= *DECADARCHIS*, Meyr., Tr. Ent. Soc. Lond. **1886**, 290—1.
1 (Type) *simulans*, Btl. (= *melanastra*, Meyr.).

417. (1) *Ereunetis simulans*, Btl. (Pl. XXV. fig. 15).

n. syn. = *melanastra*, Meyr.

Tinea simulans, Btl., Tr. Ent. Soc. Lond. **1882**, 43—4[1]. *Decadarchis melanastra*, Meyr., Tr. Ent. Soc. Lond. **1886**, 291[2].

Antennae white, annulate with brownish cinereous, basal joint white. Palpi porrect, with large expanding brush beneath, extending to the tip; white. Head white. Thorax white, with a blackish spot on the anterior margin and another posteriorly; the base of the tegulae blackish. Forewings creamy white, with large clearly defined blackish spots or patches (varying in different specimens); the first near the base of the costa extends obliquely outward and is narrowly connected along the extreme margin with a large quadrangular costal patch, at one-third, reaching to the fold and there connected at its inner angle with a small patch below the fold; near the base is a small triangular dorsal patch opposite the first costal; scarcely beyond the middle is a smaller quadrangular costal patch, followed half-way to the apex by an irregularly triangular costal patch with serrate inner margin (its apex sometimes connected narrowly with the terminal shading), between these two, but below them, is a distinctly triangular patch on the lower angle of the cell, its apex reaching nearly to the fold; two smaller dentate dorsal patches tend obliquely outward, the first about the middle, the second about the tornus; a roundish patch at the upturned apex of the wing is partly connected by scattered scales with a less distinct diffused patch on the middle of the termen; cilia white, tinged with fuscous on the middle of the termen, a fuscous line running through their middle. Exp. al. 20—23 mm. Hindwings and cilia rather shining, pale brownish cinereous. Abdomen and Legs pale brownish cinereous, the tarsal joints whitish, slightly spotted with brown.

Types *simulans*, Btl. (159: 82. 9) Mus. Br.; *melanastra*, Meyr., ♀ Mus. Lucas. [Caenotype ♂ (27520) Mus. Wlsm.]

HAB. HAWAIIA. OAHU: Honolulu (Blackburn)[1]; Mts., 2000 ft., near Honolulu (Perkins 1886); Panoa Valley, III. 1895 (Perkins). Three specimens. E. PACIFIC. MARQUESAS IS.: Nuka Hiva Id., 16—22. III. 1883 (J. J. Walker). W. PACIFIC. FIJI IS. (Lucas)[2]: Viti Levu Id., Suva (C. M. Woodford).

418. (2) *Ereunetis zebrina*, Btl. (Pl. XXV. fig. 16).

Argyresthia zebrina, Btl., Ann. & Mag. NH. (5. s.) VII. 403, No. 42 (1881)[1].

Antennae cream-white, basal joint fuscous. Palpi short, dependent, median joint fuscous; terminal joint as long as the median, white. Head dark fuscous in front, whitish above. Thorax whitish. Forewings cream-white, with three outwardly oblique dark fuscous costal patches; the first two reaching to the fold, the third produced to the apex but leaving a distinct narrow fuscous line along the base of the cream-white cilia in which there is a large dark brownish fuscous spot at the extreme apex. Exp. al. 8 mm. Hindwings as broad as the forewings, broadly lanceolate; very pale grey; cilia whitish. Abdomen whitish ochreous. Legs creamy whitish, with three fuscous tarsal spots.

Type ♀ (74 : 81. 7) Mus. Br. [Caenotype ♂ (26015) Mus. Wlsm.]

HAB. OAHU: Honolulu (Blackburn)[1]; Waianae Mts., about 2000 ft., IV. 1892. Two specimens.

Very similar in appearance to the West Indian *Ereunetis lanceolata*, Wlsm.

419. (3) *Ereunetis minuscula*, Wlsm. (Pl. XXV. fig. 17).

Ereunetis minuscula, Wlsm., Pr. Z. Soc. Lond. **1897**, 155—6, No. 246 (1897)[1].

"Antennae rather stout, enlarged at the base, simple in the ♂; creamy white. Palpi projecting more than the length of the head beyond it, brush-like beneath; creamy white. Head rough; cream-coloured. Thorax cream-coloured. Forewings cream-coloured, more or less shaded and speckled with umber-brown, this shading being concentrated (and therefore more conspicuous) from the base along the first half of the fold, from beyond the middle of the costa to the lower angle of the cell, and in a subapical oblique costal streak; a dark fuscous streaklet immediately before the extreme apex is preceded by a whitish costal patch; the termen deeply incised below and opposite to it, causing the apex of the wing to turn up sometimes almost at right-angles to its surface; cilia creamy whitish, with a slender reduplicated umber-brown line close to their tips. Exp. al. 9 mm. Hindwings, ♂ with a hyaline patch at the base; pale golden yellowish, sometimes with a cupreous tinge; cilia whitish, with a slight golden or cupreous tinge, a slender reduplicated curved line of umber-brown running through them around the extreme apex. Abdomen whitish ochreous. Legs creamy white." [Wlsm.[1]]

Type ♂ (7084); ♀ (7085) *St. Thomas*, Mus. Wlsm.

HAB. WEST INDIES. JAMAICA: Kingston, 26. VII.[1]—ST. CROIX: 22—28. IV.[1]—ST. THOMAS: 7. III.—22. IV.[1]—GRENADA: Balthazar, 250 ft., windward side, 30. IV.[1] [COLOMBIA? (Nolcken)[1]]. HAWAIIA. OAHU: Waianae Mts., IV. 1892, on tree-trunks. —HAWAII: Kaawaloa (Kona), 1500 ft., VI., IX. 1892. Twenty specimens.

420. (4) *Ereunetis flavistriata*, sp. nov. (Pl. XXV. fig. 18).

Antennae yellowish white, with two small grey spots above before the apex. Palpi yellowish white, brush-like beneath; the terminal joint very short. Head and Thorax yellowish white. Forewings yellowish white, indistinctly streaked with broken yellow lines along the fold, along the cell, and below the costa beyond the middle; also sparsely speckled with black scales, especially beyond the middle; a short blackish streak at the upturned apex runs to the end of the apical cilia and is joined by a slender golden brown streak along the base of the shining, white costal cilia; terminal cilia whitish cinereous, with a blackish spot in their middle below the apex. Exp. al. 14 mm. Hindwings shining, pale golden yellowish, becoming white at the apex; cilia pale yellowish grey. Abdomen and Legs yellowish white.

Type ♀ (26442) Mus. Wlsm.

HAB. LANAI: 2000 ft., II. 1894. Unique.

54. PHILODORIA, gen. nov.

(φιλοδωρία = bounteousness.)

Type *Philodoria succedanea*, Wlsm.

Antennae a little longer than the forewings, simple, without pecten. Labial Palpi long, curved, drooping, divergent, smooth; terminal joint almost as long as the median. Maxillary Palpi obsolete. Haustellum well-developed. Ocelli present. Head and Thorax smooth. Forewings narrow, elongate, lanceolate: neuration 12 veins all separate; 2, 5 and 6 weak; 7 to costa. Hindwings narrow, lanceolate, acute; cilia $3\frac{1}{2}$: neuration 7 veins (3 and 4 coincident); 2 and (3 + 4) stalked; cell open between 4 and 5; 5 and 6 stalked out of 7; 8 short. Abdomen slender. Legs, hind tibiae smooth.

This genus is closely allied to *Gracilaria*, Hw., but differs in the absence of the maxillary palpi.

421. (1) *Philodoria succedanea*, sp. nov. (Pl. XXV. fig. 19).

Antennae shining, tawny fuscous. Palpi shining, bronzy grey. Head shining, bronzy. Thorax aeneous. Forewings bright orange-ochreous; with a basal patch reaching to one-third, shining, metallic aeneous, except along the costa where a black triangular patch extends to two-thirds of its length; the outer edge of the basal patch tends obliquely outwards from costa to dorsum and is narrowly edged with black which connects it along the dorsum with the narrow black inner margin of an oblique, brilliant metallic aeneous fascia about the middle of the wing; this is also obliquely placed, its upper half narrower than the dorsal half and tinged with steel-blue, it is also narrowly margined externally with black, forming a slight angle on the fold; beyond this is a narrowly black-margined, steel-blue costal spot which is succeeded by a second transverse aeneous fascia, steel-blue at its upper extremity, obliquely inverted from costa to dorsum and dilated on and below the fold, its narrowly black inner margin also somewhat dilated inward on the fold; connected with the black outer margin of this fascia is a black patch extending toward the termen and apex, but exhibiting along its outer edge a bright aeneous sheen reaching to the base of the shining terminal and apical cilia, tornal cilia tawny. Exp. al. 9—10 mm. Hindwings dark tawny; cilia tawny. Abdomen tawny above, silvery beneath. Legs tawny, with silvery spurs and slightly paler tarsi.

Type ♀ (26695); ♂ (28505) Mus. Wlsm.

HAB. [? KAUAI: Mts., 3000—4000 ft., (1) VI. 1894].—MAUI: Olinda (Haleakala), 4000 ft., (9) IV. 1894, V. 1896; Haleakala, below 4000—5000 ft., (9) V. 1896. Nineteen specimens.

In some specimens the black dorsal edging connecting the basal patch with the first fascia extends to above the fold and the yellow ground-colour encroaches on the black apical patch.

The single specimen from Kauai (27297) is in very poor condition and perhaps not distinct from the Maui series.

422. (2) *Philodoria auromagnifica*, sp. nov. (Pl. XXV. fig. 20).

Antennae dark fuscous. Palpi pale cinereous. Head and face dark steely fuscous. Thorax dark brownish orange, becoming fuscous posteriorly. Forewings dark brownish orange, mixed with dark fuscous, with three transverse fasciae and one small costal spot beyond the middle, all brilliant golden, shining, metallic lilac; the first fascia is at about one-fourth, widening toward the dorsum; the second, also wider toward the dorsum, is bent back to the costa from about the middle of the wing; the third, arising on the dorsum before the tornus, is attenuated obliquely outward to the costal cilia; these fasciae are all margined with dark fuscous shading which also connects the first with the base and with the second along the dorsum, while it overspreads the middle of the wing between the second and third and the whole apical portion beyond the third; cilia shining, dark bronzy grey. Exp. al. 8 mm. Hindwings and cilia dark tawny fuscous. Abdomen and Legs fuscous above, whitish beneath.

Type ♂ (25857) Mus. Wlsm.

HAB. OAHU: Mts., near Honolulu, 2000 ft., 25. X. 1892. Unique.

423. (3) *Philodoria floscula*, sp. nov. (Pl. XXV. fig. 21).

Antennae brownish. Palpi white, a dark spot at the end of the median joint, the terminal joint also shaded with fuscous. Head brownish grey above; face white. Thorax bronzy brown. Forewings bronzy brown, with four rather outwardly oblique, shining, silver-white marginal streaks; one dorsal before the middle crossing the fold, one costal about the middle, and an opposite pair at one-fourth from the apex, between them a shining, pale green metallic patch, beyond which the apex is bright orange with a black spot before the shining, green cilia; tornal cilia tawny grey. Exp. al. 8 mm. Hindwings tawny brown; cilia tawny. Abdomen fuscous above, whitish beneath. Legs brownish.

Type ♂ (28597) Mus. Wlsm.

HAB. HAWAII: Olaa, IX. 1896; Hilo, 2000 ft., XII. 1895. Two specimens.

424. (4) *Philodoria micropetala*, sp. nov. (Pl. XXV. fig. 22).

Antennae brownish. Palpi white, a dark spot at the end of the median joint, the terminal joint also shaded with fuscous. Head and Thorax bronzy brown. Forewings bronzy brown, with four white spots; the first on the outer half of the fold, not touching the dorsum; the second on the costa beyond the middle, pointing obliquely outward and dark-margined externally; the other two situated as in *floscula*, but dark-margined on their inner sides, the metallic spot between them being bright steel-blue; beyond this an orange spot, with three white streaks in the costal cilia above it, alternate with brownish, a few fuscous scales scattered across the middle of this patch terminate in a blackish spot at its outer edge, followed by shining, steel-blue, which extends through the terminal and apical cilia. Exp. al. 8 mm. Hindwings tawny brown; cilia tawny. Abdomen fuscous above, whitish beneath. Legs brownish, spurs and a few tarsal spots whitish.

Type ♀ (27560) Mus. Wlsm.

HAB. KAUAI: Halemanu, 4000 ft., V. 1895. Unique.

This species differs from *floscula*, which it greatly resembles, in the slight separation of the plical white spot from the dorsum (this spot is erect, not oblique); in the white spots being only rather shining, pearly white (by no means bright silvery metallic white as in the other species); in the presence of three white costal streaks in the cilia above the orange patch, in the slightly shaded and less brilliant appearance of this patch itself, and in the distinctly bluer colour of the metallic scales before and beyond it.

425. (5) *Philodoria splendida*, sp. nov. (Pl. XXV. fig. 23).

Antennae greyish fuscous. Palpi whitish. Head and Thorax leaden grey; face paler. Forewings with a shining, pale leaden grey patch along one-fifth of the dorsum, connected at the base with a band of the same colour extending along the costa to one-third and thence crossing the wing somewhat obliquely outwards to the dorsum a little before the middle, the space enclosed being dark brownish ochreous; a slightly oblique dark brownish ochreous fascia crosses the middle of the wing, narrowly dark-margined on either side, and is succeeded by a second, shining, pale leaden grey fascia, running parallel with it but rather narrower than itself, this is narrowly dark-margined externally; beyond this the ground-colour of the wing is dull brownish ochreous, containing a small pale leaden grey half-fascia commencing before the costal cilia and narrowly dark-margined on either side, a small costal spot of the same colour, narrowly dark-margined anteriorly, and a large black terminal patch from tornus to apex containing two upright shining, coppery (or metallic green) spots, with a bright silvery dot between them, the termen narrowly bright metallic green; cilia shining, pale aeneous, blackish at the tornus. Exp. al. 8—9 mm. Hindwings coppery brown; cilia tawny. Abdomen tawny brown, silvery beneath. Legs greyish fuscous, with white spots on the tarsal joints and at the ends of the tibiae; spurs white.

Type ♂ (26430) *Lanai*, Mus. Wlsm.

HAB. KAUAI: Halemanu, 4000 ft., (1) V. 1895; Mts., 3000--4000 ft., (1) VI. 1894.—OAHU: Waianae Mts., 2000 ft., (1) beaten from "Lehua" (*Metrosideros polymorpha*?) IV. 1892; Mts., near Honolulu, 2000 ft., (1) 25. X. 1892.—MOLOKAI: Kalae, 1500 ft., (1) V. 1893; Mts., about 4000 ft., (1) 9. VI. 1893.—LANAI: 3000 ft., (2) II. 1894; 2000 ft., (1) VII. 1894, (1) XII. 1894. Ten specimens.

426. (6) *Philodoria basalis*, sp. nov. (Pl. XXV. fig. 24).

Antennae greyish fuscous. Palpi greyish fuscous externally, whitish on their inner sides. Head leaden grey; face whitish. Thorax greyish fuscous. Forewings with a leaden grey patch covering the whole base, reaching to one-third along the costa and to nearly half the length of the dorsum, its oblique outer edge narrowly margined with greyish fuscous; this is succeeded by a transverse oblique dark brownish ochreous band, beyond which is a narrow, oblique, shining, steel-grey fascia narrowly dark-margined on either side and slightly angulated a little above the fold; beyond this the ground-colour is pale brownish ochreous, containing two short, shining, steel-grey costal streaks, narrowly dark-margined, and a large jet-black terminal patch, reaching from tornus to apex, containing two upright steel-grey streaks near its opposite extremities, and a single bright silvery dot in its middle; a very narrow ochreous line separates it along the middle from the termen above the tornus; cilia shining, leaden grey. Exp. al. 9—10 mm. Hindwings tawny blackish; cilia tawny greyish. Abdomen greyish fuscous above, banded with white beneath. Legs pale greyish fuscous, spurs white.

Type ♂ (26666) Mus. Wlsm.

HAB. MAUI: Olinda (Haleakala), 4000 ft., IV. 1894, V. 1896. Two specimens.

Closely allied to *splendida*, which differs essentially in the brownish ochreous space within the basal patch.

427. (7) *Philodoria nigrella*, sp. nov. (Pl. XXV. fig. 25).

Antennae fuscous, white at the apex. Palpi white, the median joint streaked with fuscous externally, the terminal joint fuscous beneath. Head fuscous; face yellowish white. Thorax blackish. Forewings black, with a slight brownish gloss, a white spot at the extreme base below the middle and three short, outwardly oblique, white dorsal streaks, one near the base reaching to the fold, the second before the middle, crossing the fold, the third, shorter, at about the end of the fold; a little beyond the third dorsal is an oblique, narrow, spatulate leaden grey costal streak, which is succeeded by three white streaks in the costal cilia before the apex; at the apex is a black spot, separated beyond it by leaden grey and below it by chestnut-brown, from a black curved line around the base of the leaden grey cilia which blend with tawny fuscous about the tornus. Exp. al. 9 mm. Hindwings blackish; cilia tawny fuscous. Abdomen blackish, white beneath. Legs blackish, whitish beneath; hind tarsi spotted with whitish.

Type ♂ (28604) Mus. Wlsm.

HAB. HAWAII: Mt. Kilauea, VII. 1895; Hilo, 2000 ft., XII. 1895. Two specimens.

55. GRACILARIA, Hw.

Type *Tinea syringella*, F. (Crt. 1833).

†*GRACILLARIA*, Hw., Lp. Br. 527 (1828). ‡GRACILARIA, Z., Is. **1839**, 288—9; Meyr., HB. Br. Lp. 749—50, fig. (1895); Stgr.-Rbl., Cat. Lp. Pal. II. 206, No. 420 (1901), etc.

428. (1) *Gracilaria marginestrigata*, sp. nov. (Pl. XXV. fig. 26).

Antennae fawn colour, faintly annulate with whitish. Palpi white, a dark spot at the end of the median joint and another before the apex of the terminal joint beneath. Head and Thorax fawn colour. Forewings fawn colour, with three costal and three dorsal oblique white streaks, narrowly black-margined; the first and second costal are small, nearly meeting the extremities of the larger dorsal streaks below them, which arise in each instance nearer to the base; the third costal, very slender, commencing above and extending beyond the apex of the triangular, somewhat curved, dorsal streak below it; at the apex within this curved line is a shining, steel-grey ocellus containing a patch of black scales; from the third dorsal streak to the apex is an elongate streak of shining, blue-black scales, with three short inverted costal streaks running through the cilia; cilia shining, blue-grey, with a slender black line running through them near their base which is curved and reduplicated around the apex, bronzy grey at the tornus. Exp. al. 6—7 mm. Hindwings and cilia bronzy grey. Abdomen leaden grey. Legs greyish, with white spots at the extremities of the tibiae and tarsi.

Type ♀ (25992); ♂ (25991) *Oahu*, Mus. Wlsm.

HAB. KAUAI: Makaweli, sea-level, larva mining various plants (2) excl. v. 1895; Mts., 3000—4000 ft., (2) VI. 1894.—OAHU: Waianae Mts., 1400 ft., on the leaves of a berry-bearing plant called "Kikania" (11) IV. 1892.—MOLOKAI: sea-level, (1) V. 1893; above 3000 ft., (1) 5. VI. 1893. Seventeen specimens.

The larva makes a slender tortuous mine, in which the frass is disposed in a continuous thread along the middle, in the upper side of leaves of ....(?)............ This mine commences sometimes at the mid-rib, sometimes at the outer edge of the leaf and terminates in an ovate blotch equal to about one-fifth of the width of the leaf itself in such specimens as I have before me (27968—70). Its habits appear to be most similar to those of *coffeifoliella*, Ntnr., and *latifoliella*, Mill. & Rgt. Mr. Perkins who bred this species in Kauai made the following note "bred from blotch, or mine and blotch combined, on various plants, v. 1895. Pupa butterfly-like, living in web on leaves." He also found it (apparently the imago) "on the leaves of a berry-bearing plant called 'Kikania'" in Oahu. There is obviously some error of observation in Mr. Perkins' notes, the larvae of some other Tineid must have been collected inadvertently with those of *G. marginestrigata.*

429. (2) *Gracilaria epibathra*, sp. nov. (Pl. XXV. fig. 27).

Antennae brownish. Palpi white, a small spot on the outer side of the median joint at its apex. Head shining, dirty whitish, a few brownish scales posteriorly. Thorax olive-brown. Forewings olive-brown, with three outwardly oblique broad pearly white dorsal streaks; the first near the base, somewhat rounded at its apex; the second at the middle, attenuate; the third near the tornus, quadrate; above the latter is an outwardly oblique slender white costal streak, followed by two smaller white streaks in the costal cilia before the apex; at the end of the oblique costal streak is a small patch of shining, blue scales, narrowly surrounded by pale ochreous; with a black spot at the apex, followed by shining blue at the base of the cilia; through these runs a curved metallic blue line, the space between which and an outer curved brownish line being whitish, tornal cilia smoky brownish. Exp. al. 7 mm. Hindwings brownish, with slightly paler cilia. Abdomen dark brown. Legs brownish, with whitish tarsal spots.

Type ♂ (26056) Mus. Wlsm.

HAB. MOLOKAI: 12. VI. 1893. Unique.

56. BEDELLIA, Stn.

Type *Lyonetia somnulentella*, Z. (=*orpheella*, Stn. 1849).

BEDELLIA, Stn., Syst. Cat. Br. Tin. & Pter. 23 (1849): Ins. Br. Lp. Tin. 225, 226, No. 1, Pl. VII. 2^{a-c} (1854); Clem., Pr. Ac. Nat. Sc. Phil. xii. 8 (1860); Meyr., Pr. Lin. Soc. NSW. v. 169—70 (1880): HB. Br. Lp. 709, 758, No. 14 (1895); Stgr. & Rbl., Cat. Lp. Pal. ii. 210, No. 423 (1901); Dyar, Bull. US. Nat. Mus. **52**. 557 (1902).

430. (1) *Bedellia somnulentella*, Z. (Pl. XXV. fig. 28).

[=*convolvuliella*, Mn., *LN.*[3] (†*cousolvuliella*, HS.)]; =*orpheella*, Stn.[5]; =*staintoniella*, Clem.[18]

[*Gracilaria convolvuliella*, Mn., Verz. Microlep. p. (=7) (184...) *LN.*][1]. *Lyonetia somnulentella*, Z., Is. **1847**, 894—5, No. 432[2]: Linn. Ent. iii. 264, *Anm.* (1848)[3]. *Bedellia orpheella*, Stn., Syst. Cat. Br. Tin. & Pter. 23, No. 1 (1849)[4]. *Bedellia somnulentella*, Stn., Sppl. Cat. Br. Tin. & Pter. 25 (1851)[5]; Dgl., Tr. Ent. Soc. Lond. (n. s.), ii. 207—9, Pl. XVII. 1, 1, 1^{a-e} (1853—4)[6]; Stn., Ins. Br. Lp. Tin. 226—7, Pl. VII. 2^{a-c}, IX. 21, X. 20, 20^{a} (1854)[7]; HS., SB. Schm. Eur. v. Pl. **104**, 819 (1854): v. 336, No. 1055 (1856)[8]: vi. Syst. Verz. 68, No. 1055, Alph. Verz. v. 42 (1856)[9]; Stn., Ent. Ann. **1855**, 55 [=(2 edn.) 77] (1855)[10]: **1856**, 56[11]. *Bedellia cousolvuliella*, HS., SB. Schm. Eur. vi. p. viii, Pl. XIV. 26—9 (1856)[12]. *Bedellia somnulentella*, Frey, Tin. Pter. Schweiz. 263 (1856)[13]; Stn., Man. Br. B. & M. ii. 395 (1859)[14]: Ann. & Mag. NH. (3. s.) iii. 214 (1859)[15]. *Gracilaria convolvulella*, Fologne, Ann. Soc. Ent. Belge iv. 86—7 (1860)[16]. *Bedellia* (?) *staintoniella*, Clem., Pr. Ac. Nat. Sc. Phil. xii. 8—9 (1860)[17]; Stn., Pr. Ac. Nat. Sc. Phil. xii. 434 (1860)[18]. *Bedellia somnulentella*, Clem., Tr. Ent. Soc. Phil. i. 147—9 (1862)[19]; de Graaf, Tijd. v. Ent. xi. 66 (1868)[20]; Stn., Tin. S. Eur. 14, 213—4, 226 (1869)[21]; Z., Tijd. v. Ent. xiii. 260—1 (1870)[22]; Stgr.-Wk., Cat. Lp. Eur. 328, No. 2823 (1871)[23]; Tschnbg., Stett. Ent. Ztg. xxxii. 174—5 (1871)[24]. *Bedellia staintoniella*, Clem. & Stn., Tin. N. Am. 12, 39, 95—6 (1872)[25]. *Bedellia somnulentella*, Clem. & Stn., Tin. N. Am. 189—91 (1872)[26]; Chamb., Cin. Qr. Jr. Sc. ii. 297 (1875)[27]; Mill., Cat. Lp. Alp. Mar. 365—6 (1875)[28]; Hein-Wk., Schm. Deutsch. Tin. 697—8, No. 1117 (1876)[29]; Chamb., Bull. US. GG. Surv. iii. 133—4, 141 (1877)[30]: iv. 116—7, 131 (1878)[31]; MP. & FT., Nat. Sic. viii. 190 (1889)[32]; Hrtm., MT. Münch. Ent. Ver. iv. 54, No. 2823 (1880)[33]; Meyr., Pr. Lin. Soc. NSW. v. 170 (1880)[34]; Snell., Vlind. Ned. Microlep. 895—6, Pl. VII. 216 (1882)[35]; Hgn. & Frey, Pap. iv. 154 (1884)[36]; Meyr., Tr. NZ. Inst. xxi. 164—5, No. 15 (1888)[37]; H. Edw., Bull. US. Nat. Mus. **35**, 120 (1889)[38]; Meyr., Pr. Lin. Soc. NSW. (2. s.) vii. 600, No. 182 (1893)[39]; Wlsm., Tr. Ent. Soc. Lond. **1894**, 537, No. 24, 542 (1894)[40]; Meyr., HB. Br. Lp. 758 (1895)[41]; Rbl., Ann. KK. Hofmus. xi. 137, 147, No. 213 (1896)[42]; Busck, Pr. US. Nat. Mus. xxiii. 243—4 (1900)[43]; Stgr.-Rbl., Cat. Lp. Pal. ii. 210, No. 4107 (1901)[44]; Dyar, Bull. US. Nat. Mus. **52**. 557, No. 6337 (1902)[45].

Types ♂ ♀—*somnulentella*, Z., ♂ Mus. Wlsm.; *orpheella*, Stn. (? Mus. Br.); *staintoniella*, Clem. (No. 54), Mus. Am. Ent. Soc. Phil.

HAB. **EUROPE**[1–14, 16, 20–4, 28–30, 32–4, 37–8, 41–2, 44–5]: S.E. RUSSIA[22, 24, 44]; AUSTRIA[3, 7, 13, 22, 44]; ITALY[23, 44]; SICILY[2, 3, 7, 13, 21–2, 32]; FRANCE[21, 23, 28, 44]; SWITZERLAND[13, 23]; GERMANY[13, 22, 23]; HOLLAND[20]; BELGIUM[16, 23]; ENGLAND[4, 6–7, 13–14, 23, 41]. **MADEIRAS**[15, 40, 42, 44]. **CANARIES**[42, 44]. **UNITED STATES**[17–19, 24–7, 30–1, 34, 36–39, 41–5]: KENTUCKY[36]; ILLINOIS[25]; TEXAS[25]; COLORADO[27, 30]. **HAWAIIA.** HAWAII: Kona, 4000 ft., VIII. 1892 (Perkins). **AUSTRALIA**[34, 37, 39, 41]: QUEENSLAND[39]; N. S. WALES[34, 39]; VICTORIA[39]; S. AUSTRALIA[39]; W. AUSTRALIA[39]. **N. ZEALAND**[37, 39, 41].

LARVA. Mining leaves *Convolvulus sp.*[34, 37–8, 41]; *althaeoides*[21, 28]; *arvensis*[6, 8, 11, 13, 16, 29, 33, 36]; *cantabrica*[21]; *mauretanica*[28]; *sepium*[6, 20, 22, 29, 33]; *Ipomoea sp.*[27, 30–1, 34, 36, 38, 41]; *purpurea*[19, 22, 24–6]; *I.* (*Pharbitis*) *sp.*[31], III[21], VII[33, 35, 41], VIII[6–7, 13, 20, 29, 33, 35, 41], IX[6–7, 13, 16, 20, 29, 35, 41], X[19, 26].

IMAGO. I[41], II[26, 41], III[28, 41], IV[2, 3, 21–2, 41–2], V[2–3, 21–2, 41], VI[2–3, 21–2], VII[22], VIII[7, 13, 20, 29, 33, 35, 39, 41], IX[4, 13, 16, 20, 22, 33, 35, 39], X[7, 19, 22, 26, 29, 33, 39, 41], XI[19, 22, 26, 39, 41], XII[41], *hib.*[35]

Two large specimens which are certainly not *minor*, Busck, I name with some doubt *somnulentella*, Z. They were taken at Kona; 4000 ft., VIII. 1892 (25465; 25591, Mus. Wlsm.), and are slightly greyer than the ordinary European form, but appear to come within its range of variation.

431. (2) *Bedellia minor*, Busck.

Bedellia minor, Busck, Pr. US. Nat. Mus. XXIII. 243—4 (1900)[1]; Dyar, Bull. US. Nat. Mus. **52**. 557, No. 6338 (1902)[2].

Antennae white, annulate with brownish grey. Palpi hoary whitish. Head pale fawn, varying to hoary whitish. Thorax fawn-brownish. Forewings pale fawn-brownish, densely sprinkled with darker fawn-brown, or greyish brown, scales; cilia pale fawn-brownish, or fawn-grey, sprinkled about the apex and along the base with darker fawn-brown, or brownish grey. Exp. al. 6—7 mm. Hindwings very pale grey; cilia pale brownish grey. Abdomen greyish, yellowish beneath speckled with blackish; ♂ with genital appendages strongly developed, and with long lateral hairs. Legs brownish grey, tarsi with pale annulations.

Type (No. 4954) US. Nat. Mus. [Caenotype ♂ (25974) Mus. Wlsm.]

HAB. UNITED STATES. FLORIDA[1–2]: Palm Beach[1]. HAWAIIA. OAHU: Waianae Mts., (19) IV. 1892.—MOLOKAI: sea level, (2) V. 1893.—HAWAII: Kona, 4000 ft., (3) 13. VIII. 1892. Twenty-four specimens.

LARVA mining *Ipomoea*[1]. Bred in Oahu from larvae mining Convolvulus leaves. Larva whitish. Pupa on leaves in web. Common (Perkins).

These specimens bear the same relation to the forms of *somnulentella* as is indicated in Busck's description of *minor*, and Mr. Busck agrees that they are correctly determined. Its smaller size enables it to be readily distinguished.

432. (3) *Bedellia struthionella*, sp. nov.

Antennae hoary whitish, distinctly annulate with fuscous. Palpi very short; hoary whitish, each joint annulate with fuscous. Head rough; hoary. Thorax hoary. Forewings hoary whitish, minutely sprinkled with fuscous scales, especially visible in a short basal streak below the middle, an oblique cloudy shade extending outward from the middle of the fold and overspreading the outer half of the costa to the apex, and in a rounded cloud-spot at the end of the cell; a short chestnut-brown streak at the middle of the base is dilated outward to about one-fourth, and a chestnut-brown patch lies on the middle of the dorsum, a slight sprinkling of the same colour passing through the oblique fuscous shade above it; cilia brownish cinereous, minutely sprinkled with fuscous about the apex. Exp. al. 7—8 mm. Hindwings greyish; cilia brownish cinereous. Abdomen greyish fuscous above, hoary beneath. Legs hoary, sprinkled with fuscous, the tarsi with four fuscous annulations.

Type ♂ (25558) *Hawaii*, Mus. Wlsm.

HAB. OAHU: Waianae Mts., (3) IV. 1892.—HAWAII: Kona, 4000—5000 ft., (4) 4—17. VII. 1892, (4) 9. IX. 1892. Eleven specimens.

433. (4) *Bedellia orchilella*, sp. nov.

Antennae brownish fuscous, with whitish annulations. Palpi, Head and Thorax greyish fuscous; face paler. Forewings greyish fuscous, with some pale cinereous speckling throughout; the only indication of markings is in the absence of the pale speckling at the base of the fold, in a slight spot on the outer half of the fold, and in a short dark streak on the dorsum, but these markings are very obscure; cilia pale greyish fuscous. Exp. al. 7 mm. Hindwings dark grey; cilia greyish fuscous. Legs greyish fuscous, with whitish tarsal speckling.

Type ♂ (25930) *Oahu*, Mus. Wlsm.

HAB. KAUAI: Kaholuamano, 4000 ft., (1) IV. 1895.—OAHU: Waianae Mts., (2) IV. 1892.—HAWAII: Kona, 4000 ft., (1) 8. IX. 1892; Olaa, (1) IX. 1896. Five specimens.

These specimens all represent a form much darker and more inclined to be unicolorous than *struthionella*, and are of an entirely different tint than *minor*, Busck, showing no trace of the fawn-brown which appears only in that species.

57. SETOMORPHA, Z.

Type *Setomorpha rutella*, Z.

SETOMORPHA, Z., Hndl. Kngl. Svensk. Vet. Ak. 1852, 93—4; Btl., Ent. Mo. Mag. XIX. 107 (1882); Wlsm., Tr. Ent. Soc. Lond. **1891**, 81—2, Pl. VII. 73; Stgr.-Rbl., Cat. Lp. Pal. II. 233 (1901); Dyar, Bull. US. Nat. Mus. **52**. 575 (1902); Dietz, Tr. Am. Ent. Soc. XXXI. 14—15 ♀ (♂ = SEMIOTA, Dietz) 18. Pl. VI. 4 (1905); Busck, Pr. US. Nat. Mus. XXX. 734—5, figs. 9—10 (1906).

Butler [Ann. & Mag. NH. (5. s.) VII. 401 (1881)] proposed *Chrestotes* as a neonym in lieu of §*Safra*, Wkr. (1864) [homonymous with *Safra*, Wkr. (1863) *Lep.*], but §*Chrestotes*, Btl., is also invalid being homonymous with *Chrestotes*, Scudder (1868) *Neurop.*, while §*Safra*, Wkr., is synonymous with *Lindera*, Blanch. (1852), the type of both being *Lindera tessellatella*, Blanch. (= *Safra bogotatella*, Wkr.). Butler also (l. c.) described a new species as *Chrestotes dryas*, this however is not isotypical with *Lindera tessellatella*, Blanch., and must be referred to *Setomorpha*, Z., as also must *Semiota*, Dietz, founded on the ♂ of this genus (vide Busck l.c.).

434. (1) *Setomorpha dryas*, sp.* nov.

Chrestotes dryas, Btl., Ann. & Mag. NH. (5. s.) VII. 401, No. 39 (1881)[1].

Antennae pale fawn-brown. Palpi, Head and Thorax pale fawn-brown, sprinkled with brownish fuscous. Forewings pale fawn-brown, profusely sprinkled with brownish fuscous scales, which form numerous spots tending to run in lines, one costal, one subcostal, one discal, one plical (more or less confluent, especially on the outer half of the wing) and one subdorsal below the fold; cilia pale fawn-brown, much shaded with fuscous. Exp. al. 11—14 mm. Hindwings rather shining, brownish grey; cilia paler. Abdomen brownish grey. Legs brownish grey, tarsi whitish, banded with blackish.

Type ♀ (70: 81. 7) *Oahu*, Mus. Br.

HAB. OAHU: Honolulu (Blackburn)[1].—HAWAII: Kaawaloa (Kona), 1500 ft., VI. 1872 (Perkins). One specimen.

Closely allied to *Setomorpha rupicella*, Z. (West Indies and Brazil) and *discipunctella*, Rbl. (Canaries); forewings with veins 7 and 8 stalked out of 9; hindwings with 5 and 6 stalked.

58. ACROLEPIA, Crt.

Type *Acrolepia autumnitella*, Crt. (Crt. 1838).

ACROLEPIA, Crt., Br. Ent. XV. expl. Pl. 679 (1838); Stn., Meyr., Stgr.-Rbl., Dyar, etc.

Type *autumnitella*, Crt. [= §*pygmaeana*, Hw., auct (nec Hb.)].

435. (1) *Acrolepia aureonigrella*, sp. nov.

Antennae whitish, very distinctly annulate with black. Palpi fuscous, with two whitish annulations on the outer half of the median joint, and two on the basal half of the terminal joint, of which the tip is also whitish. Head somewhat roughly clothed above with mixed greyish fuscous and greyish ochreous hair-scales. Thorax strongly tufted posteriorly; fuscous, with a strong sprinkling of golden yellowish scales. Forewings blackish, with a strong admixture of golden yellow scaling; a slightly curved greenish grey transverse fascia, at one-fourth from the base, is outlined and streaked with blackish; a second fascia before the middle, also bent outward on the cell, has its centre greenish grey margined on either side with yellowish (of a paler tint than the more golden sprinkling which occurs between the fasciae) this is also narrowly outlined with blackish; two other fasciae beyond the middle, more distinct on their upper than on their lower halves, are mixed yellow-ochreous and greenish grey, but these are ill-defined, giving merely a mottled aspect before the blackish terminal and apical area, which is also sprinkled with ochreous and grey scales; cilia tawny brownish fuscous, with whitish streaks running through them, and a narrow dark dividing line along their middle. Exp. al. 14 mm. Hindwings tawny brownish fuscous; cilia greyish at their tips. Abdomen dark tawny grey. Legs tawny grey, with whitish annulations at the tarsal joints.

Type ♂ (26069) Mus. Wlsm.

Hab. Molokai: above 3000 ft., 26. vi. 1893. Unique.

59. Monopis, Hb.

= *BLABOPHANES*, Z.

Type *Tinea rusticella*, Hb. (Hb. 1826).

MONOPIS, Hb., Verz. Schm. 401 (1826); Meyr., Stgr.-Rbl., Dyar.
= *TINEA*, L.—(A) *BLABOPHANES*, Z., Lin. Ent. vi. 100 (1852).

436. (1) *Monopis monachella*, Hb.

[? = *mediella*, F.[8]]; = *longella*, Wkr.[6]
[? *Alucita mediella*, F., Ent. Syst. iii. (2) 337, No. 26 (1798)[1]. *Tinea monachella*, Hb., Samml. Eur. Schm. viii. Pl. XXI. (c. 1880)[2]. *Tinea longella*, Wkr., Cat. Lp. Ins. BM. xxviii. 479 (1863)[3]. *Blabophanes longella*, Btl., Ann. & Mag. NH. (5. s.) vii. 396—7, No. 29 (1881)[4]. *Blabophanes monachella*, Meyr., Ent. Mo. Mag. xx. 36 (1883)[5]: Tr. Ent. Soc. Lond. **1894**, 27[6]. *Monopis monachella*, Meyr., HB. Br. Lp. 785 (1895)[7]; Wlsm., Tr. Ent. Soc. Lond. **1897**, 63—5[8]; Stgr.-Rbl., Cat. Lp. Pal. ii. 236, No. 4536 (1901)[9].

Larva among rubbish; in birds' nests; in skins.

Hab. **EUROPE.** **ASIA.** INDIA; BURMAH; CEYLON. **W. & S. AFRICA.** **HAWAIIA**[4-8]. Oahu: Honolulu (Blackburn)[4].—Lanai: 2000 ft., XII. 1893, II. 1894 (Perkins).—Hawaii: Kona, 3000 ft., VI. 1892 (Perkins). Three specimens.

For full synonymy vide Wlsm.[8] The Hawaiian specimens belong to the variety with the white triangle clouded on the costa which was described by Walker as *longella*.

437. (2) *Monopis crocicapitella*, Clms.

n. syn. = *hyalinella*, Stgr; = (*lombardica*, Hrng.; = *heringi*, Rdsn.[6]); = **ferruginella*, Wlsm. (nec Hb.)[16].

Tinea crocicapitella, Clms., Pr. Ac. Nat. Sc. Phil. XI. 257, 258 (1859)[1]: Clms.-Stn., Tin. N. Am. pp. viii, 49, 51 (1872)[2]. *Tinea hyalinella*, Stgr., Hor. Soc. Ent. Ross. VII. 229 (1870)[3]. *Blabophanes hyalinella*, Stgr.-Wk., Cat. Lp. Eur. 269, No. 1371 (1871)[4]. *Tinea crocicapitella*, Chmb., Bull. US. GG. Surv. IV. 163 (1878)[5]. *Blabophanes* **ferruginella*, Wlsm., Tr. Am. Ent. Soc. X. 170 (1882)[6]. *Blabophanes lombardica*, Hrng., Stett. Ent. Ztg. L. 295—9 (1889)[7]; Rbl., Verh. ZB. Ges. Wien. Abh. XXXIX. (1889) 303 (1889)[8]. *Tinea* **ferruginella*, Riley, Smith's List Bor. Am. 95, No. 5085 (1901)[9]. *Blabophanes heringi*, Rdsn., Ent. Mo. Mag. XXIX. 14—15 (1893)[10]. *Blabophanes lombardica*, Snell., Tijd. v. Ent. XXXVII. 14—18, Pl. I. 4—6 (1894)[11]. *Blabophanes hyalinella*, Snell., Tijd. v. Ent. XXXVII. 16—17 (1894)[12]. *Monopis lombardica*, Stgr.-Rbl., Cat. Lp. Pal. II. 236, No. 4534 (1901)[13]. *Monopis hyalinella*, Stgr.-Rbl., Cat. Lp. Pal. II. 236, No. 4535 (1901)[14]. *Monopis* **ferruginella*, Dyar, Bull. US. Nat. Mus. **52.** 570, No. 6488 (1902)[15]. *Tinea crocicapitella*, Busck, Pr. Ent. Soc. Wash. V. 184—5 (1903)[16]. *Monopis crocicapitella*, Dietz, Tr. Am. Ent. Soc. XXXI. 31, 33—4 (1905)[17].

Types ♂♀:—*crocicapitella*, Clms., Mus. Ac. Nat. Sc. Phil.; *hyalinella*, Stgr., ♂♀ (Mus. Stgr.); *lombardica*, Hrng., ♂♀ (Mus. Hrng.); *heringi*, Rdsn. (Mus. Rdsn.).

Larva in textile stuffs[7].

Imago. e III[3], VI—VII[10-11], VIII[7, 8, 10-11], IX[7, 11], X[7, 8, 10-11], XI[7, 11], XII[11].

Hab. **EUROPE:** ENGLAND[10-11, 14]; HOLLAND[11, 14]; GERMANY[10] [?]; AUSTRIA[7-8, 12, 14]; **N. ITALY** (Lombardy)[7, 12-13]; SPAIN[3-4, 12, 14]; GREECE[3-4, 12, 14]. **HAWAIIA:** Molokai: above 3000 ft., 30. V. 1893; ♂ and ♀ *in cop.* in the house, 26. VII. 1893.—Lanai: 2000 ft., XII. 1893.—Hawaii: Kona, 4000 ft., 27. VII., 12. VIII., IX. 1892 (Perkins). **UNITED STATES**[1-2, 5-6, 9, 15-17].

438. (3) *Monopis obumbrata*, Butl.

Blabophanes obumbrata, Btl., Ann. & Mag. NH. (5. s.) VII. 396, No. 31 (1881)[1].

Antennae, Palpi, Head and Thorax dark umber-brown. Forewings dark umber-brown, sprinkled with a few brownish ochreous scales; a spot at the end of the cell is surrounded by a pale patch of brownish ochreous, by which another spot before and below it on the fold is also indicated; the apical portion of the wing and cilia sprinkled with ochreous, the latter with a darker shade along their basal half. Exp. al. 13—16 mm. Hindwings rather shining, bronzy brownish; cilia brownish grey. Abdomen and Legs dirty brownish.

Type ♀ (71: 81. 7) Mus. Br.

Hab. Oahu: Honolulu (Blackburn)[1]. Mr Perkins did not meet with this species.

The forewings have a naked depression in the disc, but veins 3 and 4 are separate, 7 and 8 stalked.

60. Tinea, L.

Type *Phalaena Tinea pellionella*, L. (F. 1775).

PHALAENA TINEA, L., Syst. Nat. (ed. x.) 496 (1758); Poda, Ins. Mus. Graec. 94 (1761). TINEA, F., Syst. Ent. 655—67 (1775); Lamarck, Syst. An. sans Vert. 288 (1801); Wlsm. & Drnt., Ent. Mo. Mag. xxxiii. 40—1 (1897); Stn., Meyr., Stgr.-Rbl., Dyar, Dietz, etc.

439. (1) *Tinea fuscipunctella*, Hw.

Tinea fuscipunctella, Hw., Lp. Br. 562, No. 4 (1828)[1]; Stgr.-Wk., Cat. Lp. Eur. 270, No. 1404 (1871)[2]; Chamb., Bull. US. GG. Surv. iv. 164 (1878)[3]; Wlsm., Tr. Ent. Soc. Lond. **1881**, 242 (1881)[4]; Meyr., Pr. Lin. Soc. NSW. (2. s.) vii. 534—5, No. 76 (1893)[5]: H.B. Br. Lp. 791 (1895)[6]; Stgr.-Rbl., Cat. Lp. Pal. ii. 238, No. 4583 (1901)[7]; Dyar, Bull. US. Nat. Mus. **52**. 571, No. 6503 (1902)[8]; Dietz, Tr. Am. Ent. Soc. xxxi. 44, 45, 47 (1905)[9], etc.

Hab. EUROPE[1-9]. W. ASIA[2, 6-7]. AFRICA, N.[6-7], W.[4], S.[4]. N. AMERICA[3, 5-6, 8-9]: LABRADOR[7, 9]. AUSTRALIA[5-6]. NEW ZEALAND[5-6]. HAWAIIA. Hawaii: Kaawaloa (Kona), 1500 ft., vi. 1892; Olaa, vi. 1895. Two specimens.

Tinea sp.?

= *Blabophanes* **rusticella*, Btl., Ann. & Mag. NH. (5. s.) vii. 396, No. 30 (1881)[1] [nec Hb.].

Type (110: 81. 7) Mus. Br.

Hab. Oahu: Honolulu (Blackburn)[1].

This is not a *Monopis*, Hb. (= *Blabophanes*, Z.), but a *Tinea*, and may be *fuscipunctella*, Hw., which occurs in Hawaii. The specimen in the British Museum is in unrecognisable condition, and one from Blackburn (Wlsm. Det. 3633: Mus. Meyr.) is scarcely better, but appears to have longer antennae than *fuscipunctella*.

61. PARAPHASIS, gen. nov.

(παράφᾰσις = consolation.)

Type *Paraphasis perkinsi*, Wlsm.

Antennae three-fourths the length of the forewings; bipectinate 5—6, the pectinations remote from each other, biciliate. Head rough. Labial Palpi porrect, projecting more than the length of the head beyond it, somewhat roughly clothed, the terminal joint short, depressed. Maxillary palpi short. Haustellum well-developed. Ocelli (not apparent). Thorax [denuded]. Forewings with the costa slightly arched towards the base; apex slightly depressed, obtuse; termen oblique, dorsum nearly parallel with costa along the middle: neuration 12 veins, all separate; 7 to termen, 3 and 4 approximating towards base. Hindwings as broad as the forewings, apex obtuse, termen evenly rounded: neuration 8 veins; 3 and 4 connate; 5 bent over towards origin of 4; an internal vein between 5 and 6; 6 and 7 separate. Abdomen much constricted at base. Legs smooth.

This genus belongs to the group of *Dissoctena*, Stgr., *Melasina*, Bdv., and *Compsoctena*, Z., with all of which it agrees in having bipectinate antennae, but the persistence of palpi and haustellum is interesting. Its antennae most resemble those of *Dissoctena*, but the well-developed palpi at once distinguish it, as also the neuration of the hindwings. The most critical point of difference between this and allied genera is "3 and 4 connate" in the hindwings, the usual tendency being towards approximation of 4 and 5.

440. (1) *Paraphasis perkinsi*, sp. nov.

Antennae pale cinereous, the pectinations brownish fuscous. Palpi dark ferruginous. Head and Thorax fawn-brownish. Forewings dark fawn-brownish, mottled with dark ferruginous and dark steel-grey, tending to form alternate, outwardly convex, transverse lines, not distinctly defined, except a little beyond the end of the cell; an inverted dark ferruginous dorsal blotch obscures the outer end of the fold, and is diffused upward across the middle of the cell; cilia ochreous on their outer half, dark fawn-grey on their basal half. Exp. al. 14 mm. Hindwings and cilia dark brownish grey. Abdomen greyish fuscous. Legs brownish grey.

Type ♂ (27268) Mus. Wlsm.

HAB. KAUAI: Mts., 3000—4000 ft., VI. 1894. Unique.

At first sight this species would probably be regarded as an *Amphisa*, allied to *gerningana*, Schiff.

SUPPLEMENTARY.

PYRALIDINA.

Lineodes, Gn.

1. *Lineodes ochrea*, Wlsm. (ante pp. 469—70).

Oahu: NW. Koolau Range, v, vii. 1901.

PTEROPHORINA.

Platyptilia, Hb.

4. *Platyptilia fuscicornis*, Z. (ante pp. 472—4).

Oahu: Waialua, coast, v. 1901.

ORNEODINA.

Orneodes, Ltr.

10. *Orneodes objurgatella*, Wlsm. (ante pp. 477—8).

Oahu: "bred from seeds of forest trees," "native, in forest" (Perkins No. 11: 1901).

TINEINA.

GELECHIADAE.

Phthorimaea, Meyr.

21. *Phthorimaea operculella*, Z. (ante pp. 483—5).

HAWAIIA. Oahu: NW. Koolau Range, vii. 1901 (Perkins). TAHITI: Papeite, 7—14. iv. 1903 (Valhalla-Nicoll).

7: 1. Gelechia, Hb.

21: 1. *Gelechia gossypiella*, Sndrs.

Depressaria gossypiella, Sndrs., Tr. Ent. Soc. Lond. iii. 284—5 (1844)[1]; Swinh.-Cotes, Cat. Moths Ind. 716, No. 4900 (1889)[2]; Cotes, Ind. Mus. Notes ii. 163 (1893)[3]. *Gelechia gossypiella*, Meyr., Jr. Bombay NH. Soc. xvi. 592 (1905)[4].

"Dark fuscous brown, the head and thorax somewhat lighter in colour. Anterior wings with an undefined round blackish spot on the disc a little above the centre, and a fascia of the same colour crossing the wings a little above the apex, which itself is black. Under wings of a silvery grey, darker towards the hinder margin. Legs and tarsi black-brown, with the joints light. Length 4—10 inch. The larva in the dried state is about 4-10ths of an inch long, largest just behind the head, of a dull red colour, with the head dark brown."

"The following is an extract of the letter which accompanied the specimens.—'The inclosed is an insect which was very destructive to the American cotton which was sown here (Broach), on light alluvial soil. The egg is deposited in the germen at the time of flowering, and the larva feeds upon the cotton seed until the pod is about to burst, a little previous to which time it has opened a round hole in the side of the pod for air, and at which to make an exit at its own convenience, dropping on the ground, which it penetrates about an inch, and winds a thin web in which it remains during the aurelia state. Curious enough, the cotton on the black soil was not touched by it. The native cotton is sometimes affected by it'."

"In the foregoing extract from Dr. Barn's letter it is interesting to remark, that the cotton grown from American seed is attacked in preference to any other, and that the cotton plant when grown upon 'black soil' remains free from injury. The former fact may be accounted for by the American cotton being of a different species to that usually grown in India, and probably offers seeds which are more suitable to the development of the larva." Saunders[1].

Larva. In bolls *Gossypium* spp.[1, 3].

Hab. **INDIA.** Bombay: Baruch (=Broach)[1-3]; Surat[4].—Oudh: Cawnpore[2], Cotton, VI. 1883.—Punjab: Lahore, "Cotton-boll moth, reared from caterpillars from Lahore" [Cotes; 6010—11 Mus. Wlsm. = Drnt. Det. 1176—7 (1894)]. **JAPAN** (Pryer; 70795 Mus. Wlsm.). **HAWAIIA.** Oahu: Honolulu, "Tineid of Cotton (introduced)," "Highly injurious to Cotton, Honolulu" (Perkins, No. 4: 1901).

The species varies in the amount of the dark suffusion on the forewings, in some specimens the costal area being almost destitute of dark shading. Exp. al. 18—21 mm. In the hindwings veins 3 and 4 are connate or stalked in both Indian and Hawaiian specimens.

Although originally described from Indian specimens it is by no means certain that *gossypiella* is truly an Indian species for Dr. Barn's notes, as published by Saunders[1], indicate strongly that the insect was imported with American Cotton which it preferred to the Indian species of *Gossypium*. Swinhoe and Cotes[2] record *gossypiella* from Cawnpore with a "?"—this mark of doubt is misplaced, the specimen was correctly determined as *gossypiella*, Sndrs., the "?" had reference to its being wrongly described as a *Depressaria* by Saunders (Durrant and Meyrick have both referred *gossypiella* to *Gelechia*, Hb.).

No special information accompanied this Cawnpore specimen (labelled "Cotton, VI. 1883"), but in the accumulation of "Notes on insect pests from the Entomological

Section, Indian Museum," published by the late Lionel de Nicéville in Indian Museum Notes, Vol. v. No. 3 (1903), we find (p. 183) under *Earias fabia* that Egyptian Cotton was grown on the experimental farm at Cawnpore. It is therefore presumable that this specimen of *gossypiella* was associated with imported Egyptian Cotton. We also read (l.c. p. 183) that: "On 4th December 1893 the Director of Land Records and Agriculture, Punjab, Lahore, sent some pods [bolls] of Egyptian cotton, containing green and white insects tunnelling into the pods. A single moth was bred from these, but was unidentified." This bred specimen was regarded as probably a variety of *Earias fabia*, but it has been overlooked that *Gelechia gossypiella* was also bred from these Lahore Cotton bolls. Two specimens were sent to Merton (6010—11 Mus. Wlsm.) with the note "Cotton-boll moth reared from caterpillars from Lahore" (Cotes, i. l., 19. II. 1894)—these were determined as *Gelechia gossypiella*, Sndrs. (Drnt. Det. 1176—7: 1894). It would therefore seem that both the Lahore and Cawnpore specimens were imported with Egyptian cotton. We have no information as to the probable origin of the Surat specimens recorded by Meyrick[4] and may therefore assume that their history is similar to that of the other Indian specimens. Mr Perkins notes the Hawaiian specimens as "Tineid of Cotton (introduced)"—unfortunately he gives no indication of the locality whence it came—and at present we have no evidence that the species occurs in America, but a single specimen from Japan (70795, Mus. Wlsm.) in very poor condition would seem to be *gossypiella*.

STOEBERHINUS, Btl.

22. *Stoeberhinus testaceus*, Btl. (ante p. 486).

OAHU: Honolulu, Mts., VI. 1900; SE. Koolau Range, VII. 1900.

THYROCOPA, Meyr.

34. *Thyrocopa argentea*, Btl. (ante p. 496).

OAHU: NW. Koolau Range, VII. 1901.

46. *Thyrocopa pallida*, Wlsm. (ante pp. 502—3).

OAHU: SE. Koolau Range, VII. 1900; Honolulu, "dead wood feeder."

49. *Thyrocopa usitata*, Btl. (ante p. 504).

OAHU: NW. and SE. Koolau Range, VII. 1901.

50. *Thyrocopa abusa*, Wlsm. (ante pp. 504—5).

OAHU: Honolulu, coast, I. 1901; SE. Koolau Range, VII. 1901.

HYPONOMEUTIDAE.

Batrachedra, Stn.

56. *Batrachedra syrraphella*, Wlsm. (ante p. 509).
Oahu: NW. Koolau Range, vii. 1901.

Hyposmocoma, Btl.

145. *Hyposmocoma trossulella*, Wlsm. (ante pp. 554—5).
Oahu: NW. Koolau Range, vii. 1901.

147. *Hyposmocoma nebulifera*, Wlsm. (ante pp. 555—6).
Oahu: SE. Koolau Range, vii. 1900; NW. Koolau Range, vii. 1901.

154. *Hyposmocoma abjecta*, Btl. (ante p. 559).
Oahu: NW. Koolau Range, vii. 1901.

155. *Hyposmocoma blackburnii*, Btl. (ante pp. 559—60).
Oahu: Honolulu, Mts., vii. 1900.

159^{b}. *Hyposmocoma lupella*, Wlsm. + *suffusella*, Wlsm. (ante p. 564).
Oahu: NW. Koolau Range, vii. 1901.

160. *Hyposmocoma mediella*, Wlsm. (ante p. 565).
Oahu: NW. Koolau Range, vii. 1901.

228. *Hyposmocoma argentea*, Wlsm. (ante p. 596).
Oahu: NW. Koolau Range, vii. 1901.

236. *Hyposmocoma alliterata*, Wlsm. (ante p. 600).
Oahu: NW. Koolau Range, vii. 1901.

246. *Hyposmocoma dorsella*, Wlsm. (ante p. 605).
Oahu: NW. Koolau Range, vii. 1901.

275. *Hyposmocoma tarsimaculata*, Wlsm. (ante p. 618).
Oahu: NW. Koolau Range, vii. 1901.

293. *Hyposmocoma nebulifera*, Wlsm. (ante p. 628).

Oahu: SE. Koolau Range, vii. 1900; NW. Koolau Range, vii. 1901.

306. *Hyposmocoma radiatella*, Wlsm. (ante p. 634).

Oahu: SE. Koolau Range, vii. 1900.

Euperissus, Btl.

318. *Euperissus cristatus*, Btl. (ante pp. 643—4).

Oahu: NW. Koolau Range, vii. 1901.

Prays, Hb.

329. *Prays fulvocanellus*, Wlsm. (ante p. 652).

Oahu: Honolulu, Mts., vi. 1900; NW. Koolau Range, vii. 1901.

CARPOSINIDAE.

Heterocrossa, Meyr.

339. *Heterocrossa herbarum*, Wlsm. (ante p. 658).

Oahu: SE. Koolau Range, vii. 1900; NW. Koolau Range, vii. 1901.

343. *Heterocrossa subumbrata*, Wlsm. (ante p. 660).

Oahu: NW. Koolau Range, vii. 1901.

352. *Heterocrossa nigromaculata*, Wlsm. (ante p. 666).

Oahu: NW. Koolau Range, vii. 1901.

359. *Heterocrossa pusilla*, Wlsm. (ante p. 670).

Oahu: NW. Koolau Range, vii. 1901.

TORTRICIDAE.

Eccoptocera, Wlsm.

365. *Eccoptocera foetorivorans*, Btl. (ante pp. 674—5).

Oahu: NW. Koolau Range, vii. 1901; Larva—*Metrosideros* "Ohia" (Koebele, No. 2079) Perkins, No. 5: 1901.

CROCIDOSEMA, Z.

366. *Crocidosema plebeiana*, Z. (ante pp. 675—6).

OAHU: Waialua, coast, V. 1901; NW. Koolau Range, VII. 1901; Honolulu "probably introduced, common about Honolulu and in the Mts." (Perkins).

GYPSONOMA, Meyr.

367. *Gypsonoma leprarum*, Wlsm. (ante p. 676).

OAHU: NW. Koolau Range, VII. 1901; Honolulu.

ENARMONIA, Hb.

378. *Enarmonia walsinghami*, Btl. (antè pp. 684—5).

OAHU: NW. Koolau Range, VII. 1901.

ARCHIPS, Hb.

384. *Archips postvittanus*, Wkr. (ante pp. 690—1).

HAWAIIA. OAHU: Waianae, Larva *Euphorbia* spp., excl. I. 1901; Honolulu, Larva *Citrus* spp., excl. I. 1901; Waialua, coast, V. 1901, 2000 ft., Larva *Acacia koa*, excl. IX. 1900; NW. Koolau Range, VII. 1901. "Tortrix (introduced) polyphagous, especially injurious to species of *Citrus*. Rather variable. Probably Australian as it is found in NEW CALEDONIA. Polyphagous and increasing enormously in the islands." (Perkins, No. 7: 1900).

385. *Archips longiplicatus*, Wlsm. (ante pp. 691—2).

OAHU: NW. Koolau Range, IV. 1901; N. Koolau Range, VIII. 1901.

385: 1. *Archips capucinus*, Wlsm.

Tortrix (?) *capucina*, Wlsm., Fn. Hw. I. 701—2, No. 398, Pl. XI. 23 (1907)[1].

HAB. OAHU: NW. Koolau Range (♂♀), VII. 1901.—MOLOKAI: 4000 ft., 23. IX. 1893[1].—HAWAII: Kona, 3000 ft., VI. 1892[1].

The reception of the ♂ renders it necessary to remove this species to the genus *Archips*.

TORTRIX, L.

398. *Tortrix* (?) *capucina*, Wlsm. (ante pp. 701—2) = *Archips capucinus*, Wlsm. 385: 1.

TINEIDAE.

OPOGONA, Z.

416. *Opogona aurisquamosa*, Btl. (ante pp. 713—4).

OAHU: Honolulu, Mts., VI. 1900.

EREUNETIS, Meyr.

417. *Ereunetis simulans*, Btl. (ante p. 715).

OAHU: NW. Koolau Range, V, VII. 1901; SE. Koolau Range, VII. 1900; N. Koolau Range, VIII. 1901. "Black and white wood-eating Tineid, introduced," "Black and white Tineid of dead bark, now in thousands in Oahu—introduced" (Perkins, No 10: 1901).

419. *Ereunetis minuscula*, Wlsm. (ante p. 716).

OAHU: "Tineid with upturned tip to wings. Bred from seeds of introduced *Acacia* etc. etc." (Perkins, No. 12: 1901).

PHILODORIA, Wlsm.

425. *Philodoria splendida*, Wlsm. (ante pp. 719—20).

OAHU: NW. Koolau Range, VII. 1901.

MONOPIS, Hb.

437. *Monopis crocicapitella*, Clms. (ante p. 728).

OAHU: NW. Koolau Range, VII. 1901.

REMARKS.

After long and careful study of the *Microlepidoptera* of Hawaiia it may be useful to make some general remarks upon such points as presented themselves during the progress of the work. Careful detailed analyses have been made to illustrate the geographical distribution of all the species and of some critical genera from which may be seen the proportions of those which may be regarded as autochthonous, or otherwise, as well as their interinsular relationship or representation. From these it has been attempted at least to conjecture the probable origin of the Hawaiian Fauna.

Until my own studies were approximately completed I had carefully avoided reading the prefaces to other papers already published upon different branches of the Entomology of these Islands, lest there should be any temptation to adopt conclusions arrived at by others rather than to form an independent opinion from the material in hand, but on comparing these prefaces with my own notes and analyses it is impossible not to recognise that the observations made in any one paper are mainly applicable to all the others, and assuredly the *Microlepidoptera* suggest no exception to what appears to be the general impression as to the origin and present process of distribution of the species occurring in this group of islands.

It may be observed that many years ago Frederick Smith and de Saussure (as quoted by Perkins) regarded the Aculeate *Hymenoptera* as of American origin, but Perkins dismisses this suggestion, from his own experience, as probably founded upon the study of what were mainly artificially-introduced species.

In dealing with the *Coleoptera* Dr. Sharp mentions two genera of *Plegithmysides* as seeming to be nearest allied to the genera *Neoclytus* and *Euryscelis* which are found in North and Central America and in the Greater Antilles. We may be led to imply that he attributed an American origin to these genera, but I am unable to discover that he has indicated any leaning towards the adoption of a similar theory as concerning the majority of the Hawaiian *Coleoptera*.

It is most remarkable that whereas the *Gelechiadae* are very largely represented in the western regions of North America these are nearly absent from Hawaiia, almost the only genera in this family being allied to *Thyrocopa*, Meyr., a group (*Xyloryctidae*) of distinctly Australian affinity. In fact the main indication of similarity throughout the *Microlepidoptera*, while pointing to a common origin, precludes the belief that such origin could have been either Asiatic or American. The survival of isolated remnants of an older fauna seems to be indicated, precisely such as might be expected to occur through the submersion of lower portions of some vast continent and the maintenance of its highest peaks in the form of oceanic islands. If the supposition of a lost "PACIFICA" may not be acceptable, as accounting for the prevalent similarity which I have mentioned, some other theory must be devised, possibly even less capable of support by the evidence of facts and at least equally beyond the possibility of precise proof.

One thing certainly strikes us very forcibly in regard to the close affinity of species and the extreme difficulty of finding reliable and persistent generic characters, viz. that the Hawaiian *Microlepidoptera* are in a condition of progressive, and at present imperfect, differentiation. For, whereas in all other continental collections we find an abundance of distinct and easily recognisable species and genera, intermixed with some few only difficult to identify, the Hawaiian *Microlepidoptera* are in the great majority of instances so closely allied, or so confusingly similar, as to present the utmost difficulty in any attempt at classification or description. Each prevalent form seems to possess representatives in the various islands, but these are scarcely ever absolutely inseparable *in series*, and possess in each case some distinctive peculiarity of colour, or markings, or secondary sexual characters, which seems to entitle them to recognition as at least geographical species. It is not uncommon to find in a long series of specimens, apparently similar at first sight, that a certain proportion of the males possess an expansible subcostal hair-pencil at the base of the hindwings which is wanting in others, and a minute examination usually discloses persistent differences, however slight, which enable the species to be distinguished from each other in either sex. I was at first disposed to regard this sexual character as of generic value, but the idea was ultimately abandoned in view of the varying degree in which it was represented, and of the precise similarity, in all other structural details, of the very numerous specimens under observation. The same plasticity extends to other structural characters, such as the pecten on the basal joint of the antennae, the clothing of the tibiae, the comparative breadth of the fore and hindwings, and the relative length of the palpal joints; the neuration also is occasionally unstable (see remarks under the genus *Diplosara*, Meyr., pp. 646—7, etc.).

The absence of *Oecophoridae*, one species, *Ethmia colonella* (introduced), representing this family, is the most notable point in which the Hawaiian *Tineina* differ from those of Australia, for *Oecophoridae* are probably more abundantly represented there than any other family.

Microlepidoptera ought to prove very useful in determining the affinities of the Hawaiian fauna. Their extremely delicate nature, short lives, and restricted food-plants cause the majority of them to be very locally distributed, and thus less likely to be imported than other more enduring forms—some few exceptional instances are referred to.

The Microlepidopterous Fauna of Hawaiia is almost exclusively autochthonous, having apparently been formed through the splitting-up of species by compulsory segregation. This would naturally occur under the hypothesis that these islands represent merely the tops of mountain ranges formerly belonging to one continent over which, before such isolation, these species had a wide range with no special cause for variation. The study of ethnology, and of the languages, habits, and superstitions of native races seems to support the theory of a common origin, and, given a Pacifican Fauna we should expect it to persist in isolated groups of islands extending from Hawaiia to New Zealand, and, so far as one can judge, this appears to be the case.

The following extracts are from Ellis' Polynesian Researches, IV. (2nd edn. 1831.)

Discussing the question of the Pacific Islanders having "an Asiatic, and probably a Malayan, origin."—

"The natives of the eastern part of New Holland, and the intertropical islands within thirty degrees east, including New Caledonia, the New Hebrides, and the Figiis, appear to be one nation, and in all probability came originally from the Asiatic islands to the northward, as their skin is black, and their hair woolly or crisped, like the inhabitants of the mountainous parts of several of the Asiatic islands. But the inhabitants of all the islands to the east of the Figiis, including the Friendly Islands and New Zealand, though they have many characteristics in common with these, have a number essentially distinct.

The natives of Chatham Island and New Zealand, in the south; the Sandwich Islands, in the north; the Friendly Islands, in the west; and all the intermediate islands, as far as Easter Island, in the east, are one people. Their mythology, traditions, manners and customs, language, and physical appearance, in their main features, are, so far as we have had an opportunity of becoming acquainted with them, identically the same, yet differing in many respects from those of the islands to the westward of Tongatabu.

The dress of the Figiians, &c. is not the same as that of the natives of New Zealand, Tahiti, and the other islands; they do not appear to wear the cloak, or the *tiputa*. In war, they throw long spears to a considerable distance, and use the bow and arrow, which the others only employ in their amusements.

The difference in their physical character is greater; the dark complexion, woolly hair, and slender make, indicate them to be a different people.

Various points of resemblance have been shewn between the aborigines of America and the natives of the eastern islands of the Pacific, in their modes of war, instruments, gymnastic games, rafts or canoes, treatment of their children, dressing their hair, feather head-dresses of the chiefs, girdles, and particularly the *tiputa* of the latter, which in shape and use, exactly resembles the *poncho* of the Peruvians.

These circumstances seem to favour the conjecture, that the inhabitants of the islands west of Tongatabu have an Asiatic origin entirely; but that the natives of the eastern islands may be a mixed race, who have emigrated from the American continent, and from the Asiatic islands; that the proximity of the Friendly and Figii islands may have given both a variety of words and usages in common, while the people to which the former belong have remained in many respects distinct.

The nation inhabiting the eastern part of the Pacific has spread itself over an immense tract of ocean, extending upwards of seventy degrees north and south from New Zealand and Chatham Island to the Sandwich group, and between sixty and seventy degrees east and west from Tongatabu to Easter Island. This last is not farther from the islands adjacent to the continent than some of these groups are from any other inhabited island. The Sandwich Islands are above twenty degrees from the Marquesas, and thirty-six from Tahiti, yet inhabited by the same race of people." (Ellis, l. c. 432—4.)

The people of Hawaii.

"They said they were informed by their fathers, that all the land had once been overflowed by the sea, except a small peak on the top of Mouna-Kea, where two human beings were preserved from the destruction that overtook the rest, but they said they had never before heard of a ship, or of Noah, having always been accustomed to call it the *kai a Kahinárii* (sea of Kahinarii)." (Ellis, l. c. 441—2.)

"The general opinions entertained by the natives themselves, relative to their origin, are, either that the first inhabitants were created on the islands, descended from the gods by whom they were first inhabited, or that they came from a country which they called Tahiti." (Ellis, l. c. 428.)

"In former times, when there was nothing but sea, an immense bird settled on the water, and laid an egg, which soon bursting, produced the island of Hawaii. Shortly after this, a man and woman, with a hog, a dog, and a pair of fowls, arrived in a canoe from the Society Islands, took up their abode on the eastern shores, and were the progenitors of the present inhabitants." (Ellis, l. c. 430.)

"Another account prevalent among the natives of Oahu, states, that a number of persons arrived in a canoe from Tahiti." (Ellis, l. c. 430.)

"*Tahiti* is the name of the principal island in the group, called by Captain Cook the Georgian Islands. It is the *Otaheite* of Cook; the *Taïti* of Bougainville; and the *Taheitee*, or *Tahitee*, of Forster. In the language of the Georgian and Society Islands, the word *tahiti* also signifies to pull up or take out of the ground, as herbs or trees are taken up with a view to transplantation, and to select or extract passages from a book or language, to be translated into another. Hence a book of scripture extracts is called, words, *tahitihea*." (Ellis, l. c. 431.)

Tahiti "seems equivalent to the English word *abroad*, as applied to parts beyond the sea." (Ellis, l. c. 431.)

Society Islands.

"Raiatea is not only the most important island of the Leeward group, from its central situation and its geographical extent, but on account of its identity, in tradition, with the origin of the people, and their preservation in the general deluge. It has been distinguished as the cradle of their mythology, the birth-place and residence of Oro, the region to which disembodied spirits resorted, the seat of their oracle, and the abode of those priests whose predictions for many generations regulated the expectations of the nation. It is also intimately connected with the most important matters in the traditional history and ancient religion of the people." (Ellis, l. c. II. 314—5.)

"In some of the ancient traditions of the Society Islands, Opoa, in Raiatea, the most celebrated place in the islands, the birth-place of Oro, and the spot where the human species were created, &c. is called *Hawaii.*" (Ellis, l. c. IV. 431.)

"Opoa is the most remarkable place in Raiatea; of its earth, according to some of the traditions, the first pair were made by Tii, or Taaroa, and on its soil they fixed their abode. Here Oro held his court. It was called Hawaii; and as distant colonies are said to have proceeded from it, it was probably the place at which some of the inhabitants of the South Sea Islands arrived. It has also long been a place of celebrity, not only in Raiatea, but throughout the whole of the Society Islands. It was the hereditary land of the reigning family, and the usual residence of the king and his household." (Ellis, l. c. II. 314—5.)

Language and Customs.

The same method of salutation (rubbing noses) practised by all the inhabitants of the Pacific, also in Madagascar, this custom is called "*Ho-gni*" (New Zealand); "*Hoi*" (Tahiti); "*Honi*" (Hawaiia). (Ellis, l. c. 337.)

Mr. Perkins informs me that a very large proportion of the species dealt with in this paper were obtained by searching upon trunks of trees and among dead leaves under forest growth. As might be expected under such circumstances many of them were proved to be case-bearers, and without doubt this habit is characteristic, especially of such genera as are found rich in species. The most commonly known European case-bearing Tineina are those of the genus *Coleophora*, Hb., and it is at least a coincidence that in the perfect state these are also extremely difficult to distinguish from each other without some knowledge of their preliminary stages. Many attempts have been made to recognise characters of generic value among the numerous species of this genus, but *Coleophora*, as now generally accepted, presents a gradation of structure which not only fails to afford satisfactory lines for higher classification, but sometimes increases the difficulty of determining the limits of rightly accepted species. This applies specially to the more or less fugitive hair-scales at the base of the antennae, sometimes well-developed, sometimes weak, and often absent. If all the known species of Holarctic *Coleophorae* (many of them represented by a single specimen) were mixed together in a series of store-boxes it would not be more difficult to identify the species correctly, without any clue to their life-histories, than it has been to work through a correspondingly numerous collection of the genus *Hyposmocoma*, Btl., consisting of at least 170 species, and to determine the limits of special variation. Yet it will be obvious to anyone acquainted with the subject that a series of *Coleophorae* selected at random would almost certainly include several consistently distinct species.

If the above illustration may convey some idea of the interminable series of mutations by which the differentiation of species has progressed, a study of generic characters is almost equally confusing. The general notion derived from such study is that the process of branching from a common stem must have commenced before the evolution of some of our best-known and hitherto easily recognised families—e.g. Meyrick's diagnostic separation of the *Elachistidae* from the *Hyponomeutidae* (= *Plutellidae*, Meyr.) on the comparative breadth of the hindwings can no longer be maintained. The variation in these forms in Hawaiia is evidently greater than any that occurs among their congeners in Australia, although the Australian Fauna, from which Meyrick's experience has been largely derived, is supposed to be one of the oldest—the question arises, are we not dealing with a fauna derived from forms ancestral even to those which have been preserved in that region?

It would be easy to select many instances of what might be called either broad-winged *Elachistidae*, or narrow-winged *Hyponomeutidae* (connected by intermediate forms) from among the material with which I have dealt, and the conclusion is forced upon us that such radiation from a common stock as may be presumed to have occurred, dates from a period antecedent to the differentiation of these hitherto accepted families, and although elsewhere their connecting links seem to have disappeared, yet, so far as this limited fauna is concerned, they cannot be separated, and can therefore no longer be regarded as separable.

It may be interesting to observe the proportionate number of species represented in the Hawaiian Islands, according to our present acquaintance with what are known as the *Macrolepidoptera* and the *Microlepidoptera*.

Meyrick's list contains 292 species (including the *Rhopalocera*) and he has worked out all the families to the end of the *Pyralidina*.

Of the *Pterophorina* and *Tineina*, which are now dealt with, I have distinguished 441 species, and although it is possible that some few of these forms may eventually be found to be varietal, rather than special, the actual proportions will almost certainly be readjusted by the future differentiation of others which are here regarded as varieties.

Thus the numerical relation borne by the micros to the macros is 441 to 292, while the endemic proportion is 420 to 261.

Mr. Perkins devoted a great deal of time to the *Macrolepidoptera*, and it was only when he failed to find species not previously met with that he gave special attention to the smaller forms. It is therefore reasonable to regard the above proportions as approximately representing the facts of the case. I have every reason to believe that if an equally extensive knowledge of the fauna of other portions of the world's surface could be acquired it would be found in the majority of cases that somewhat similar proportions would be maintained, and we look back with some surprise to Stainton's delight and astonishment when he first received Indian *Microlepidoptera* from Atkinson, so late as the year 1855, and still more to the statement of Curtis, at the same date (Pr. Ent. Soc. Lond. **1855**, 93—4), that he doubted whether *Microlepidoptera* would be found so plentiful in tropical countries as Stainton anticipated on the strength of this consignment because during a late expedition in the South of Europe in company with Francis Walker, during which they sought especially for *Microlepidoptera*, the number of small moths among their 6000 captures was very few. Perhaps Walker shared Curtis' views before he became a too-prolific author of descriptions of exotic micros!

Before Mr. Perkins so laboriously and persistently dragged these Hawaiian *Tineina* from their obscurity 35 species only, as now admitted, had been described; 1 by

Walker, 29 by Butler, and 5 by Meyrick, the two latter authors working out Blackburn's collections. Mr. Meyrick also collected a few species in Oahu himself, in 1883, which by his courtesy are included in the present paper. I have also to thank him especially for having lent me all his material, including types of his own species and genera, and such exponents of Butler's species as Blackburn had numbered and retained for his own use.

It will be recognised by all practical workers that the examination of so large a collection has been no easy task. The specimens, although for the most part in good condition, were merely pinned on blocks of cork with a dated locality label beneath. On each block were insects of various sizes, thus every specimen had to be provisionally registered before they could be relaxed in groups selected according to size, and therefore according to the amount of moisture required, the provisional labels being of course rendered useless after damping, and serving only to preserve a reference to the details in MS. All were repinned and set. The amount of mere manual labour which this involved has been a severe tax upon the time and industry of my assistant Mr. Durrant, but that was after all only the lighter part of his work. He has also undertaken for me a detailed examination of structural characters, and the sorting-out of species and genera preparatory to final arrangement and description.

If anything could have damped the enthusiasm of a specialist devoted to his subject the genera *Hyposmocoma*, *Aphthonetus*, *Neelysia*, and *Heterocrossa* would assuredly have done so, but in verifying his work I have found scarcely any errors and these only such as were absolutely unavoidable in dealing with such a mass of material. He examined the neuration and other minute structural characters of *every* specimen in the collection. Many which were almost absolutely similar in colour and markings were found to differ in more important respects, and the discovery of one difference invariably led to the recognition of others which had at first sight been overlooked. Generic separation, which at first seemed obvious, had frequently to be discarded as valueless, and the work had thus to be done three or four times over before a satisfactory conclusion could be reached. I cannot sufficiently commend, or acknowledge, the patience and perseverance with which he has relieved me of by far the greater part of this labour and made my task, if not actually easy, yet far less painfully exhausting than his own.

Whatever remarks are to be found in prefaces to other papers on Hawaiian entomology are in entire sympathy with the above-mentioned experiences as to variability and plasticity, and the consequent difficulties of precise differentiation and classification.

The analytical tables will be found to supply the evidence, which has led to the conclusions adopted above, and in nearly all cases a remarkable symmetry will be observed between these and similar tables which accompany the work of other entomologists—most noticeably perhaps with regard to the ratio of endemic and apodemic species, and to the proportionate numbers of each as represented in particular islands.

TABLE OF DISTRIBUTION.

Genus	Species		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Distribution
		I. *PYRALIDINA*, pp. 469, 731							
		I. PYRAUSTIDAE, pp. 469, 731							
1	...	LINEODES, Gn., pp. 469, 731							
	1	1 *ochrea*, W., pp. 469, 731, Pl. X. 1	1	1	...	...	...	1	
	2	2 *subextincta*, W., p. 470, Pl. X. 2	2	...	1	...	...	2	
		II. *PTEROPHORINA*, pp. 471, 731							
2	...	TRICHOPTILUS, Wlsm., p. 471							
	3	1 *oxydactylus*, Wkr., p. 471, Pl. X. 3	...	2	2	...	1	...	(? United States), West Indies, Arabia, India, Ceylon, New Guinea, Queensland
3	...	PLATYPTILIA, Hb., pp. 472, 731							
	4	1 *fuscicornis*, Z., pp. 472, 731, Pl. X. 4	3	3	3	1	2	...	Colombia
	5	2 *brachymorpha*, Meyr., p. 474, Pl. X. 5	...	4	..	...	...	3	
	6	3 *rhynchophora*, Meyr., p. 475, Pl. X. 6	4	5	4	...	3	4	
	7	4 *insularis*, W., p. 475, Pl. X. 7	...	6	5	...	...	...	
	8	5 *littoralis*, Btl., p. 476, Pl. X. 8—9	...	7	...	...	...	5	
		III. *ORNEODINA*, pp. 477, 731							
4	...	ORNEODES, Ltr., pp. 477, 731							
	9	1 *angustestriata*, W., p. 477, Pl. X. 10	5	...	...	...	...	...	
	10	2 *objurgatella*, W., pp. 477, 731, Pl. X. 11	...	8	...	..	...	...	
		IV. *TINEINA*, pp. 478, 731							
		I. GELECHIADAE, pp. 478, 731							
5	...	ARISTOTELIA, Hb., p. 478							
	11	1 *maculaticornis*, W., p. 478, Pl. XIII. 17	...	...	...	...	...	6	
	12	2 *nigriciliella*, W., p. 479, Pl. XIII. 18	...	...	...	...	...	7	
	13	3 *ichthyochroa*, W., p. 479, Pl. XIII. 19	...	...	6	...	...	...	
	14	4 *epermeniella*, W., p. 480, Pl. XIII. 20	6	...	...	...	...	...	
	15	5 *notata*, W., p. 480, Pl. XIII. 21	...	...	7	...	...	...	
	16	6 *lanaiensis*, W., p. 481, Pl. XIII. 22	...	...	...	2	...	...	
	17	7 *elegantior*, W., p. 481, Pl. XIII. 23	...	9	...	...	...	...	
	18	8 *mendax*, W., p. 481, Pl. XIII. 24	7	...	...	...	...	...	
	19	9 *arcuata*, W., p. 482, Pl. XIII. 25	...	10	...	...	...	...	
6	...	MERIMNETRIA, W., p. 482							
	20	1 *flaviterminella*, W., p. 482, Pl. XIII. 26	...	...	...	...	...	8	
7	...	PHTHORIMAEA, Meyr., pp. 483, 731							
	21	1 *operculella*, Z., pp. 483, 731, Pl. XIII. 27	8	11	8	...	...	9	Spain, Algeria, Canaries, West Indies, United States, Australia, New Zealand, Tahiti
7 : 1	...	GELECHIA, Hb., p. 731							
	21 : 1	1 *gossypiella*, Sndrs., p. 731	...	12	...	...	...	...	India, Japan
8	...	STOEBERHINUS, Btl., pp. 485, 733							
	22	1 *testaceus*, Btl., pp. 486, 733, Pl. XIII. 28	9	13	9	...	...	10	Marquesas
9	...	AUTOSTICHA, Meyr., p. 486							
	23	1 *pelodes*, Meyr., p. 487, Pl. XIV. 1	...	14	...	...	...	...	

Genus	Species		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Distribution
10	...	HODEGIA, W., p. 488							
	24	1 *apatela*, W., p. 488, Pl. XIV. 2	...	...	...	...	4	...	
11	...	PTYCHOTHRIX, W., p. 489							
	25	1 *vagans*, W., p. 489, Pl. XIV. 3	10	...	...	...	...	...	
12	...	PSYCHRA, W., p. 489							
	26	1 *phycidiformis*, W., p. 490, Pl. XIV. 4	11	...	...	...	...	...	
	27	2 *brevipalpis*, W., p. 490, Pl. XIV. 5	12	...	...	...	...	...	
13	...	CATAMEMPSIS, W., p. 491							
	28	1 *decipiens*, W., p. 491, Pl. XIV. 6	...	15	...	...	...	11	
14	...	THYROCOPA, Meyr., pp. 492, 733							
	29	1 *gigas*, Btl., p. 493, Pl. XIV. 7	13	16	10	...	5	...	
	30	2 *viduella*, W., p. 494, Pl. XIV. 8	14	...	...	...	...	...	
	31	3 *cinerella*, W., p. 494, Pl. XIV. 9	15	...	...	...	...	...	
	32	4 *megas*, W., p. 495, Pl. XIV. 10	...	...	...	...	6	...	
	33	5 *albonubila*, W., pp. 495, Pl. XIV. 11	16	...	...	...	...	...	
	34	6 *argentea*, Btl., pp. 496, 733, Pl. XIV. 12	...	17	...	...	...	12	
	35	7 *minor*, W., p. 496, Pl. XIV. 13	...	...	11	...	...	...	
	36	8 *indecora*, Btl., p. 497, Pl. XIV. ♂ 14, ♀ 15	...	...	...	...	7	...	
	37	9 *tessellatella*, W., p. 498, Pl. XIV. 16	...	...	...	...	...	13	
	38	10 *depressariella*, W., p. 498, Pl. XIV. 17	17	...	...	...	...	...	
	39	11 *nubifer*, W., p. 499, Pl. XIV. 18	...	...	...	...	...	14	
	40	12 *seminatella*, W., p. 499, Pl. XIV. 19	18	...	...	...	...	...	
	41	13 *pulverulenta*, W., p. 500, Pl. XIV. 20	...	...	...	...	...	15	
	42	14 *epicapna*, Meyr., p. 500, Pl. XIV. 21	19	...	...	...	...	16	
	43	15 *alterna*, W., p. 501, Pl. XIV. 22	...	...	...	...	8	17	
	44	16 *immutata*, W., p. 501, Pl. XIV. 23	20	...	...	...	...	...	
	45	17 *fraudulentella*, W., p. 502, Pl. XIV. 24	...	...	...	...	9	18	
	46	18 *pallida*, W., pp. 502, 733, Pl. XIV. 25	21	18	12	...	...	...	
	47	19 *adumbrata*, W., p. 503, Pl. XIV. 26	...	...	...	...	...	19	
	48	20 *inermis*, W., p. 503, Pl. XIV. 27	...	...	...	...	...	20	
	49	21 *usitata*, Btl., pp. 504, 733, Pl. XIV. 28	22	19	...	...	...	21	
	50	22 *abusa*, W., pp. 504, 733, Pl. XV. 1	...	20	...	...	...	...	
	51	23 *subahenea*, W., p. 505, Pl. XV. 2	...	...	13	...	...	...	
	52	24 *leonina*, W., p. 505, Pl. XV. 3	...	...	...	3	...	...	
	53	25 *geminipuncta*, W., p. 506, Pl. XV. 4	...	...	14	...	...	...	
	54	26 *mediomaculata*, W., p. 506, Pl. XV. 5	...	...	...	...	10	(?)	
		II. OECOPHORIDAE, p. 507							
15	...	ETHMIA, Hb., p. 507							
	55	1 *colonella*, W., p. 507, Pl. XV. 6	...	21	...	...	...	...	
		III. HYPONOMEUTIDAE, pp. 508, 734							
16	...	BATRACHEDRA, Stn., pp. 508, 734							
	56	1 *syrraphella*, W.. pp. 509, 734, Pl. XV. 7	...	22	...	...	...	22	
	57	2 *ephelus*, W., p. 509, Pl. XV. 8	...	...	15	...	...	...	
	58	3 *bedelliella*, W., p. 509, Pl. XV. 9	...	...	16	...	11	...	
	59	4 *microstigma*, W., p. 510, Pl. XV. 10	...	23	...	...	...	23	
	60	5 *supercincta*, W., p. 510, Pl. XV. 11	...	...	...	...	12	...	
	61	6 *ruficiliata*, W., p. 510, Pl. XV. 12	...	...	...	...	...	24	
	62	7 *lomentella*, W., p. 511, Pl. XV. 13	...	24	...	...	...	...	
	63	8 *sophroniella*, W., p. 511, Pl. XV. 14	...	25	...	...	...	...	
17	...	AGONISMUS, W., p. 512							
	64	1 *flavipalpis*, W., p. 512, Pl. XV. 15	...	...	...	...	13	...	
	65	2 *coruscans*, W., p. 513, Pl. XV. 16	...	...	...	...	...	25	
	66	3 *argentiferus*, W., p. 513, Pl. XV. 17	...	...	...	...	...	26	
18	...	ELACHISTA, Tr., p. 513							
	67	1 *spilota*, W., p. 513, Pl. XV. 18	...	...	...	...	14	...	
	68	2 *longisquamella*, W., p. 514, Pl. XV. 19	...	...	...	...	...	27	

Genus	Species		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Distribution
19	...	STAGMATOPHORA, HS., p. 514							
	69	1 *incertulella*, Wkr., p. 515, Pl. XV. 20	...	...	...	...	15	...	
	[69^a	1^a *tridigitella*, W., p. 515	...	...	...	...	...	...	Not Hawaiian: S. Pacific: Rapa (Opara Id.), Pitcairn Id.]
	70	2 *honorariella*, W., p. 515, Pl. XV. 21	...	...	...	...	...	...	Hawaiia (*Ins.*?), Pitcairn Id.
	71	3 *quadrifasciata*, W., p. 516, Pl. XV. 22	...	...	...	...	...	...	Hawaiia (*Ins.*?), New Guinea
	72	4 *sordidella*, W., p. 516, Pl. XV. 23	23	...	...	...	...	...	
20	...	APHTHONETUS, W., p. 517							
	73	1 *mediocris*, W., p. 517, Pl. XV. 24	...	...	...	...	16	...	
	74	2 *fugitiva*, W., p. 518, Pl. XV. 25	24	...	...	...	...	...	
	75	3 *kauaiensis*, W., p. 518, Pl. XV. 26	25	...	...	...	...	...	
	76	4 *corticicolor*, W., p. 519, Pl. XV. 27	...	...	...	...	17	...	
	77	5 *fluctuosa*, W., p. 519, Pl. XV. 28	26	...	...	...	...	...	
	78	6 *passerella*, W., p. 520, Pl. XVI. 1	27	...	...	...	...	...	
	79	7 *divergens*, W., p. 520, Pl. XVI. 2	...	...	17	...	...	...	
	80	8 *bitincta*, W., p. 521, Pl. XVI. 3	...	...	...	...	18	...	
	81	9 *columbella*, W., p. 521, Pl. XVI. 4	...	...	18	...	...	...	
	82	10 *lichenalis*, W., p. 522, Pl. XVI. 5	...	...	...	4	...	...	
	83	11 *digressa*, W., p. 522, Pl. XVI. 6	...	...	...	...	19	...	
	84	12 *eleuthera*, W., p. 522, Pl. XVI. 7	...	...	...	...	...	28	
	85	13 *confusa*, W., p. 523, Pl. XVI. 8	...	...	...	...	20	...	
	86	14 *spurcata*, W., p. 523, Pl. XVI. 9	...	...	...	...	21	...	
	87	15 *plumbifer*, W., p. 524, Pl. XVI. 10	28	...	...	...	...	...	
	88	16 *trichophora*, W., p. 524, Pl. XVI. 11	29	...	...	...	...	...	
	89	17 *veterella*, W., p. 525, Pl. XVI. 12	30	...	...	...	...	...	
	90	18 *polia*, W., p. 525, Pl. XVI. 13	31	...	...	...	...	...	
	91	19 *subocellata*, W., p. 526, Pl. XVI. 14	...	...	...	...	22	...	
	92	20 *nemo*, W., p. 526, Pl. XVI. 15	...	...	...	...	23	...	
	93	21 *exsul*, W., p. 526, Pl. XVI. 16	...	...	...	...	...	29	
	94	22 *albocinerea*, W., p. 527, Pl. XVI. 17	32	...	...	...	...	...	
	95	23 *diffusa*, W., p. 527, Pl. XVI. 18	33	...	...	...	24	...	
	96	24 *hirsuta*, W., p. 528, Pl. XVI. 19	34	...	...	...	...	...	
	97	25 *humerella*, W., p. 528, Pl. XVI. 20	...	...	...	...	25	...	
	98	26 *puncticiliata*, W., p. 529, Pl. XVI. 21	...	...	...	...	...	30	
	99	27 *aspersa*, Btl., p. 529, Pl. XVI. 22	...	26	...	...	...	...	
	100	28 *elegans*, W., p. 530, Pl. XVI. 23	...	...	...	...	26	...	
	101	29 *sagittata*, W., p. 530, Pl. XVI. 24	35	...	...	...	...	...	
21	...	RHINOMACTRUM, W., p. 531							
	102	1 *rutilellum*, W., p. 531, Pl. XVI. 25	36	...	...	...	...	...	
	103	2 *scapulellum*, W., p. 531, Pl. XVI. 26	...	...	...	...	...	31	
22	...	NEELYSIA, W., p. 532							
	104	1 *cuprea*, W., p. 532, Pl. XVI. 27	37	...	...	...	...	...	
	105	2 *tigrina*, Btl., p. 533, Pl. XVI. 28	...	...	...	...	27	...	
	106	3 *lignicolor*, W., p. 533, Pl. XVII. 1	...	...	...	...	28	...	
	107	4 *fuscodentata*, W., p. 534, Pl. XVII. 2	...	...	...	...	...	32	
	108	5 *cleodorella*, W., p. 535, Pl. XVII. 3	...	...	...	...	...	33	
	109	6 *anthinella*, W., p. 535, Pl. XVII. 4	...	...	...	5	...	...	
	110	7 *repandella*, W., p. 536, Pl. XVII. 5	...	...	19	...	...	...	
	111	8 *psaroderma*, W., p. 536, Pl. XVII. 6	...	27	...	...	...	...	
	112	9 *municeps*, W., p. 537, Pl. XVII. 7	38	...	...	...	29	...	
	113	10 *paltodorella*, W., p. 537, Pl. XVII. 8	39	...	...	...	...	...	
	114	11 *fuscofusa*, W., p. 538, Pl. XVII. 9	40	...	...	...	...	...	
	115	12 *agnetella*, W., p. 538, Pl. XVII. 10	...	...	...	...	30	...	
	116	13 *rotifer*, W., p. 539, Pl. XVII. 11	...	...	20	...	...	...	
	117	14 *basivittata*, W., p. 539, Pl. XVII. 12	...	...	...	...	31	...	
	118	15 *pluviella*, W., p. 540, Pl. XVII. 13	...	...	21	...	...	...	
	119	16 *ningorifera*, W., p. 540, Pl. XVII. 14	...	...	...	...	32	...	
	120	17 *petalifera*, W., p. 541, Pl. XVII. 15	...	...	...	...	33	...	

Genus	Species		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Distribution
2	...	NEELYSIA (*contd.*)							
	121	18 *subaurata*, W., p. 541, Pl. XVII. 16	41	...	...	...	...	...	
	122	19 *exaltata*, W., p. 542, Pl. XVII. 17	...	...	...	...	34	...	
	123	20 *poeciloceras*, W., p. 542, Pl. XVII. 18	...	...	...	...	35	...	
	124	21 *rediviva*, W., p. 543, Pl. XVII. 19	42	...	...	...	...	...	
	125	22 *ningorella*, W., p. 543, Pl. XVII. 20	...	...	...	...	36	...	
	126	23 *nemoricola*, W., p. 544, Pl. XVII. 21	...	...	22	...	...	...	
	127	24 *argyresthiella*, W., p. 544, Pl. XVII. 22	43	28	...	...	...	34	
	128	25 *mactella*, W., p. 545, Pl. XVII. 23	44	29	23	...	...	...	
	129	26 *tischeriella*, W., p. 545, Pl. XVII. 24	45	...	...	...	...	...	
	130	27 *complanella*, W., p. 546, Pl. XVII. 25	...	...	24	...	...	...	
	131	28 *sciurella*, W., p. 546, Pl. XVII. 26	...	...	...	...	37	...	
	132	29 *incongrua*, W., p. 546, Pl. XVII. 27	...	...	...	...	38	...	
	133	30 *semifusa*, W., p. 547, Pl. XVII. 28	...	...	25	...	...	...	
	134	31 *terminella*, W., p. 547, Pl. XVIII. 1	...	...	...	...	39	...	
3	...	DYSPHORIA, W., p. 547							
	135	1 *semicolon*, W., p. 548, Pl. XVIII. 2	46	...	...	...	...	...	
4	...	BUBALOCERAS, W., p. 548							
	136	1 *subeburneum*, W., p. 549, Pl. XVIII. 3	...	...	26	...	...	...	
5	...	HYPOSMOCOMA, Btl., p. 549, 734							
	137^a	1^a *exornata*, W. + *exornata*, W., p. 550, Pl. XVIII. 4	...	...	...	...	...	35^a	
	137^b	1^b *exornata*, W. + *flavicosta*, W., p. 551, Pl. XVIII. 5	...	...	...	...	...	35^b	
	138	2 *oculifera*, W., p. 551, Pl. XVIII. 6	47	...	...	...	...	...	
	139	3 *nigralbida*, W., p. 551, Pl. XVIII. 7	48	...	...	...	...	...	
	140	4 *nividorsella*, W., p. 552, Pl. XVIII. 8	49	...	...	...	...	...	
	141	5 *corvina*, Btl., p. 553, Pl. XVIII. 9 ...	...	...	27	...	40	...	
	142	6 *discella*, W., p. 553, Pl. XVIII. 10 ...	50	...	...	...	...	...	
	143	7 *divisa*, W., p. 554, Pl. XVIII. 11 ...	51	...	...	...	...	...	
	144	8 *partita*, W., p. 554, Pl. XVIII. 12 ...	...	...	...	...	...	36	
	145	9 *trossulella*, W., pp. 554, 734, Pl. XVIII. 13	...	30	...	...	...	...	
	146	10 *atrovittella*, W., p. 555, Pl. XVIII. 14	...	...	...	...	...	37	
	147	11 *nebulifera*, W., pp. 555, 734, Pl. XVIII. 15	...	31	...	...	...	...	
	148	12 *torquata*, W., p. 556, Pl. XVIII. 16	52	...	...	...	...	...	
	149	13 *notabilis*, W., p. 556, Pl. XVIII. 17	...	...	28	...	...	...	
	150	14 *lebetella*, W., p. 557, Pl. XVIII. 18	...	...	...	...	41	...	
	151	15 *tenuipalpis*, W., p. 557, Pl. XVIII. 19	...	...	29	...	...	...	
	152	16 *commensella*. W., p. 558, Pl. XVIII. 20	...	...	...	...	...	38	
	153	17 *leporella*, W., p. 558, Pl. XVIII. 21	53	...	...	...	...	...	
	154	18 *abjecta*, Btl., pp. 559, 734, Pl. XVIII. 22	...	32	...	...	...	...	
	155	19 *blackburnii*, Btl., pp. 559, 734, Pl. XVIII. 23	54	33	...	...	42	...	
	156	20 *cupreomaculata*, W., p. 561, Pl. XVIII. 24	...	...	30	...	...	...	
	157	21 *progressa*, W., p. 561, Pl. XVIII. 25	...	...	...	...	43	...	
	158^a	22^a *domicolens*, Btl. + *domicolens*, Btl., p. 562, Pl. XVIII. 26	...	...	31	6	44	39^a	
	158^b	22^b *domicolens*, Btl. + *suffusa*, W., p. 563, Pl. XVIII. 27	55	...	...	...	...	39^b	
	159^a	23^a *lupella*, W. + *lupella*, W., p. 563, Pl. XVIII. 28	56^a	...	...	...	...	...	
	159^b	23^b *lupella*, W. + *suffusella*, W., pp. 564, 734, Pl. XIX. 1	56^b	34	32^a	...	45^a	...	
	159^c	23^c *lupella*, W. + *candidella*, W., p. 564, Pl. XIX. 2	56^c	...	32^b	7	45^b	40	
	160	24 *mediella*, W., pp. 565, 734, Pl. XIX. 3	...	35	...	...	...	...	
	161	25 *sabulella*, W., p. 565, Pl. XIX. 4 ...	57	...	...	...	...	...	
	162	26 *albifrontella*, W., p. 565, Pl. XIX. 5	...	...	33	...	...	...	

Genus	Species		Kauai	Oahu	Molokai	Lánai	Maui	Hawaii	Distribution
25	...	HYPOSMOCOMA (*contd.*)							
	163	27 *humerovittella*, W., p. 566, Pl. XIX. 6	...	36	...	...	...	...	
	164^a	28^a *cincta*, W. + *cincta*, W., p. 566, Pl. XIX. 7	58^a	...	...	...	...	...	
	164^b	28^b *cincta*, W. + *adjacens*, W., p. 567, Pl. XIX. 8	58^b	...	...	...	...	...	
	165	29 *mediospurcata*, W., p. 567, Pl. XIX. 9	...	...	...	...	...	41	
	166	30 *tripartita*, W., p. 567, Pl. XIX. 10	...	...	34	...	...	...	
	167	31 *thoracella*, W., p. 568, Pl. XIX. 11	...	...	...	8	...	...	
	168	32 *limata*, W., p. 568, Pl. XIX. 12	...	...	...	...	...	42	
	169	33 *sublimata*, W., p. 568, Pl. XIX. 13	...	...	...	...	46	...	
	170	34 *advena*, W., p. 569, Pl. XIX. 14	...	...	35	...	...	...	
	171	35 *subflavidella*, W., p. 569, Pl. XIX. 15	...	...	...	...	47	...	
	172	36 *auroargentea*, W., p. 570, Pl. XIX. 16	...	...	...	...	48	...	
	173	37 *illuminata*, W., p. 570, Pl. XIX. 17	...	...	...	...	49	...	
	174	38 *auripennis*, Btl., p. 571, Pl. XIX. 18	...	...	...	...	50	...	
	175	39 *rhabdophora*, W., p. 571, Pl. XIX. 19	...	...	36	...	...	...	
	176	40 *costimaculata*, W., p. 572, Pl. XIX. 20	...	...	37	...	...	...	
	177	41 *virgata*, W., p. 572, Pl. XIX. 21	...	...	38	...	51	...	
	178	42 *bilineata*, W., p. 573, Pl. XIX. 22	...	37	...	...	...	...	
	179	43 *haleakalae*, Btl., p. 573, Pl. XIX. 23	...	...	...	...	52	...	
	180	44 *lucifer*, W., p. 574, Pl. XIX. 24	...	...	39	...	...	...	
	181	45 *evanescens*, W., p. 574, Pl. XIX. 25	...	...	...	...	53	...	
	182	46 *ferricolor*, W., p. 575, Pl. XIX. 26	...	...	...	...	...	43	
	183	47 *impunctata*, W., p. 575, Pl. XIX. 27	...	...	...	...	...	44	
	184	48 *straminella*, W., p. 576, Pl. XIX. 28	...	...	...	...	...	45	
	185	49 *metallica*, W., p. 576, Pl. XX. 1	...	...	...	...	...	46	
	186	50 *continuella*, W., p. 577, Pl. XX. 2	...	...	...	...	54	...	
	187	51 *indicella*, W., p. 577, Pl. XX. 3	...	...	...	...	55	...	
	188	52 *patriciella*, W., p. 577, Pl. XX. 4	...	...	...	...	56	...	
	189	53 *butalidella*, W., p. 578, Pl. XX. 5	...	...	...	...	57	...	
	190	54 *unistriata*, W., p. 578, Pl. XX. 6	...	...	40	...	...	...	
	191	55 *ludificata*, W., p. 579, Pl. XX. 7	...	...	...	...	58	...	
	192	56 *lineata*, W., p. 579, Pl. XX. 8	...	...	...	...	59	...	
	193	57 *propinqua*, W., p. 580, Pl. XX. 9	...	...	41	...	...	...	
	194	58 *admirationis*, W., p. 580, Pl. XX. 10	...	...	42	...	...	...	
	195	59 *quadristriata*, W., p. 581, Pl. XX. 11	...	...	43	...	...	...	
	196	60 *numida*, W., p. 581, Pl. XX. 12	...	...	...	...	60	...	
	197	61 *nigrescens*, W., p. 581, Pl. XX. 13	...	...	...	...	...	47	
	198	62 *fuscopurpurea*, W., p. 582, Pl. XX. 14	...	...	...	...	61	...	
	199	63 *nigra*, W. (†*niger*, W.), p. 582, Pl. XX. 15	...	...	44	...	...	...	
	200	64 *lacertella*, W., p. 582, Pl. XX. 16	...	...	...	...	62	...	
	201	65 *trilunella*, W., p. 583, Pl. XX. 17	...	...	...	...	63	...	
	202	66 *niveiceps*, W., p. 583, Pl. XX. 18	...	...	45	9	...	...	
	203	67 *punctifumella*, W., p. 584, Pl. XX. 19	...	...	...	...	64	...	
	204	68 *lunifer*, W., p. 584, Pl. XX. 20	...	...	...	...	65	...	
	205	69 *punctiplicata*, W., p. 584, Pl. XX. 21	...	...	46	...	...	...	
	206	70 *marginenotata*, W., p. 585, Pl. XX. 22	59	...	...	...	...	...	
	207	71 *vermiculata*, W., p. 585, Pl. XX. 23	...	...	47	...	...	48	
	208	72 *enixa*, W., p. 586, Pl. XX. 24	60	...	...	...	...	...	
	209	73 *lugens*, W., p. 586, Pl. XX. 25	...	...	...	...	66	...	
	210	74 *ocellata*, W., p. 586, Pl. XX. 26	61	...	...	...	...	...	
	211	75 *adolescens*, W., p. 587, Pl. XX. 27	...	...	...	...	...	49	
	212	76 *emendata*, W., p. 587, Pl. XX. 28	...	...	...	...	67	...	
	213	77 *ensifer*, W., p. 588, Pl. XXI. 1	...	...	...	...	...	50	
	214	78 *tricincta*, W., p. 588, Pl. XXI. 2	...	...	...	...	...	51	
	215	79 *semifuscata*, W., p. 589, Pl. XXI. 3	...	...	...	...	...	52	

Genus	Species		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Distribution
5	...	HYPOSMOCOMA (*contd.*)							
	216	80 *pucciniella*, W., p. 589, Pl. XXI. 4 ...	...	...	...	...	...	53	
	217ª	81ª *scepticella*, W. + *scepticella*, W., p. 590, Pl. XXI. 6	...	...	...	...	68ª	...	
	217ᵇ	81ᵇ *scepticella*, W. + *dubia*, W., p. 590, Pl. XXI. 5	...	...	...	...	68ᵇ	...	
	218	82 *stigmatella*, W., p. 591, Pl. XXI. 7	...	...	48	...	...	...	
	219	83 *pallidipalpis*, W., p. 591, Pl. XXI. 8	...	...	49	...	...	...	
	220	84 *genitalis*, W., p. 592, Pl. XXI. 9 ...	...	...	...	...	69	...	
	221	85 *fractinubella*, W., p. 592, Pl. XXI. 10	...	...	...	...	70	...	
	222	86 *fractivittella*, W., p. 593, Pl. XXI. 11	62	...	...	...	...	...	
	223	87 *intermixta*, W., p. 593, Pl. XXI. 12	...	...	50	...	...	...	
	224	88 *geminella*, W., p. 594, Pl. XXI. 13	63	...	...	...	...	...	
	225	89 *picticornis*, W., p. 594, Pl. XXI. 14	...	...	51	...	71	...	
	226	90 *phantasmatella*, W., p. 595, Pl. XXI. 15	64	...	...	...	...	...	
	227	91 *ossea*, W., p. 595, Pl. XXI. 16 ...	...	...	...	...	...	54	
	228	92 *argentea*, W., pp. 596, 734, Pl. XXI. 17	...	38	52	...	...	...	
	229	93 *subargentea*, W., p. 596, Pl. XXI. 18	65	...	...	...	...	...	
	230	94 *lactea*, W., p. 597, Pl. XXI. 19 ...	66	...	...	...	...	...	
	231	95 *lacticretella*, W., p. 597, Pl. XXI. 20	...	...	...	...	72	...	
	232	96 *persimilis*, W., p. 598, Pl. XXI. 21	...	...	...	...	...	55	
	233	97 *trimaculata*, W., p. 598, Pl. XXI. 22	...	39	...	...	...	...	
	234	98 *albonivea*, W., p. 599, Pl. XXI. 23	...	40	...	...	...	...	
	235	99 *carbonenotata*, W., p. 599, Pl. XXI. 24	67	...	...	...	...	...	
	236	100 *alliterata*, W., pp. 600, 734, Pl. XXI. 25	...	41	53	...	73	56	
	237	101 *nigrodentata*, W., p. 600, Pl. XXI. 26	68	...	...	...	...	...	
	238	102 *obliterata*, W., p. 601, Pl. XXI. 27	69	...	...	...	...	...	
	239	103 *bacillella*, W., p. 601, Pl. XXI. 28 ...	70	...	...	...	...	...	
	240	104 *canella*, W., p. 602, Pl. XXII. 1 ...	71	42	54	...	...	57	
	241	105 *schismatica*, W., p. 603, Pl. XXII. 2	72	...	...	...	...	...	
	242	106 *cinerosparsa*, W., p. 603, Pl. XXII. 3	73	...	...	...	...	...	
	243	107 *saccophora*, W., p. 604, Pl. XXII. 4	74	43	55	...	...	...	
	244	108 *modesta*, W., p. 604, Pl. XXII. 5 ...	75	...	...	...	...	...	
	245	109 *tomentosa*, W., pp. 605, 734, Pl. XXII. 6	...	...	...	...	...	58	
	246	110 *dorsella*, W., pp. 605, 734, Pl. XXII. 7	...	44	...	...	...	...	
	247	111 *fallacella*, W., p. 605, Pl. XXII. 8 ...	76	...	...	...	...	...	
	248	112 *falsimella*, W., p. 606, Pl. XXII. 9	...	...	...	...	74	...	
	249	113 *ochreovittella*, W., p. 606, Pl. XXII. 10	...	...	...	...	...	59	
	250	114 *quadripunctata*, W., p. 607, Pl. XXII. 11	77	...	...	...	...	...	
	251	115 *sudorella*, W., p. 607, Pl. XXII. 12	78	...	...	...	...	...	
	252	116 *vicina*, W., p. 607, Pl. XXII. 13 ...	...	45	...	...	...	...	
	253	117 *fulvida*, W., p. 608, Pl. XXII. 14 ...	79	...	56	...	...	...	
	254	118 *sideritis*, W., p. 608, Pl. XXII. 15 ...	...	...	...	...	75	...	
	255	119 *obscura*, W., p. 609, Pl. XXII. 16 ...	...	...	...	...	76	...	
	256	120 *scandens*, W., p. 609, Pl. XXII. 17	80	...	...	...	...	...	
	257	121 *maestella*, W., p. 610, Pl. XXII. 18	81	...	...	...	...	...	
	258	122 *fulvocervina*, W., p. 610, Pl. XXII. 19	82	...	...	...	...	...	
	259	123 *carnea*, W., p. 610, Pl. XXII. 20 ...	83	...	...	...	...	...	
	260	124 *roseofulva*, W., p. 611, Pl. XXII. 21	84	...	...	...	...	...	
	261	125 *subsericea*, W., p. 611, Pl. XXII. 22	85	...	57	10	...	60	
	262	126 *ochreocervina*, W., p. 612, Pl. XXII. 23	...	46	...	...	...	...	
	263	127 *syrrhaptes*, W., p. 612, Pl. XXII. 24	86	...	...	...	...	...	
	264	128 *paradoxa*, W., p. 613, Pl. XXII. 25	87	...	58	...	...	...	
	265	129 *mimema*, W., p. 613, Pl. XXII. 26	...	...	...	...	77	...	
	266	130 *bella*, W., p. 614, Pl. XXII. 27 ...	88	...	...	...	...	...	
	267	131 *rusius*, W., p. 614, Pl. XXII. 28 ...	...	...	59	...	...	...	
	268	132 *auropurpurea*, W., p. 614, Pl. XXIII. 1	...	47	...	...	...	...	
	269	133 *inversella*, W., p. 615, Pl. XXIII. 2	...	48	...	...	...	...	

Genus	Species		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Distribution
25	...	HYPOSMOCOMA (*contd.*)							
	270	134 *vinicolor*, W., p. 615, Pl. XXIII. 3 ...	...	49	...	...	...	...	
	271	135 *adelphella*, W., p. 615, Pl. XXIII. 4 ...	89	...	...	...	...	61	
	272	136 *metrosiderella*, W., p. 616, Pl. XXIII. 5	90	50	...	...	...	...	
	273	137 *similis*, W., p. 617, Pl. XXIII. 6 ...	...	...	...	...	...	62	
	274	138 *calva*, W., p. 617, Pl. XXIII. 7 ...	...	...	...	...	...	63	
	275	139 *tarsimaculata*, W., pp. 618, 734, Pl. XXIII. 8	91	51	...	...	...	...	
	276	140 *ochreociliata*, W., p. 618, Pl. XXIII. 9	...	...	...	...	...	64	
	277	141 *malornata*, W., p. 619, Pl. XXIII. 10	92	...	60	...	78	65	
	278	142 *quinquemaculata*, W., p. 619, Pl. XXIII. 11	...	...	...	...	...	66	
	279	143 *conditella*, W., p. 620, Pl. XXIII. 12	93	...	...	...	...	...	
	280	144 *montivolans*, Btl., p. 620, Pl. XXIII. 13	...	52	...	...	...	...	
	281	145 *iodes*, W., p. 621, Pl. XXIII. 14 ...	...	...	61	...	...	...	
	282	146 *liturata*, W., p. 622, Pl. XXIII. 15 ...	...	...	62	...	...	67	
	283	147 *mimica*, W., p. 622, Pl. XXIII. 16 ...	...	...	63	...	...	...	
	284	148 *parda*, Btl., p. 623, Pl. XXIII. 17 ...	...	...	...	...	79	68	
	285	149 *lixiviella*, W., p. 623, Pl. XXIII. 18	94	...	...	...	...	...	
	286	150 *saliaris*, W., p. 624, Pl. XXIII. 19 ...	...	...	...	...	...	69	
	287	151 *phalacra*, W., p. 625, Pl. XXIII. 20	95	...	...	...	...	...	
	288	152 *pseudolita*, W., p. 625, Pl. XXIII. 21	...	53	64	...	...	70	
	289	153 *irregularis*, W., p. 626, Pl. XXIII. 22	96	...	...	...	...	...	
	290	154 *fervida*, W., p. 626, Pl. XXIII. 23 ...	...	...	65	...	...	...	
	291	155 *torella*, W., p. 627, Pl. XXIII. 24 ...	...	...	66	...	...	...	
	292	156 *arenella*, W., p. 627, Pl. XXIII. 25 ...	...	...	...	...	...	71	
	293	157 *nebulifera*, W., pp. 628, 735, Pl. XXIII. 26	...	54	...	...	80	...	
	294	158 *rubescens*, W., p. 628, Pl. XXIII. 27	97	...	...	...	81	...	
	295	159 *scolopax*, W., p. 629, Pl. XXIII. 28 ...	98	...	67	...	...	...	
	296	160 *subscolopax*, W., p. 629, Pl. XXIV. 1	...	...	...	...	...	72	
	297	161 *tetraonella*, W., p. 630, Pl. XXIV. 2 ...	...	...	...	...	...	73	
	298	162 *somatodes*, W., p. 630, Pl. XXIV. 3 ...	...	...	...	...	...	74	
	299	163 *belophora*, W., p. 631, Pl. XXIV. 4 ...	...	55	...	...	...	...	
	300	164 *turdella*, W., p. 631, Pl. XXIV. 5 ...	...	...	...	11	...	...	
	301	165 *subcitrella*, W., p. 632, Pl. XXIV. 6 ...	99	...	...	...	...	...	
	302	166 *inflexa*, W., p. 632, Pl. XXIV. 7 ...	...	...	...	...	82	...	
	303	167 *brevistrigata*, W., p. 633, Pl. XXIV. 8	100	...	...	...	...	...	
	304	168 *discolor*, W., p. 633, Pl. XXIV. 9 ...	...	...	...	...	...	75	
	305	169 *fuscotogata*, W., p. 634, Pl. XXIV. 10	...	...	68	...	...	...	
	306	170 *radiatella*, W., pp. 634, 735, Pl. XXIV. 11	101	56	69	...	...	76	
	307	171 *barbata*, W., p. 635, Pl. XXIV. 12 ...	...	...	70	...	...	...	
	308	172 *fractistriata*, W., p. 635, Pl. XXIV. 13	...	57	...	12	...	...	
	309	173 *longitudinalis*, W., p. 636, Pl. XXIV. 14	...	58	71	...	...	77	
	310	174 *centralis*, W., p. 636, Pl. XXIV. 15 ...	102	...	...	...	...	...	
	311^{a}	175^{a} *chilonella*, W. + *triocellata*, W., p. 637, Pl. XXIV. 16	103^{a}	...	72^{a}	...	...	78^{a}	
	311^{b}	175^{b} *chilonella*, W. + *chilonella*, W., p. 637, Pl. XXIV. 17	103^{b}	...	...	...	...	78^{b}	
	311^{c}	175^{c} *chilonella*, W. + *venosa*, W., p. 638, Pl. XXIV. 18	103^{c}	...	72^{b}	...	...	78^{c}	
	311^{d}	175^{d} *chilonella*, W. + *percondita*, W., p. 638, Pl. XXIV. 19	103^{d}	...	...	...	...	78^{d}	
	312	176 *epicharis*, W., p. 639, Pl. XXIV. 20 ...	...	...	73	...	...	...	
	313	177 *subnitida*, W., p. 639, Pl. XXIV. 21 ...	...	...	...	...	...	79	
26	...	HYPERDASYS, W., p. 640							
	314	1 *semiustus*, W., p. 640, Pl. XXIV. 22 ...	104	...	...	...	...	...	
	315	2 *arundinicolor*, W., p. 641, Pl. XXIV. 23	105	...	...	...	...	...	
	316	3 *unicolor*, W., p. 642, Pl. XXIV. 24 ...	...	...	74	...	...	...	
	317	4 *cryptogamiellus*, W., p. 642, Pl. XXIV. 25	106	59	75	13	...	80	

Genus	Species		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Distribution
27	...	Euperissus, Btl., pp. 643, 735							
	318	1 *cristatus*, Btl., pp. 643, 735, Pl. XXIV. 26	...	60	76	...	...	81	
28	...	Semnoprepia, W., p. 644							
	319	1 *fulvogrisea*, W., p. 644, Pl. XXIV. 27	107	...	...	...	...	...	
	320	2 *petroptilota*, W., p. 645, Pl. XXIV. 28	...	...	...	...	83	82	
	321	3 *margella*, W., p. 645, Pl. XXV. 1 ...	...	...	...	...	...	83	
29	...	Diplosara, Meyr., p. 646							
	322	1 *lignivora*, Btl., p. 647, Pl. XXV. 2	108	61	77	14	...	84	
30	...	Blastobasis, Z., p. 648							
	323	1 *inana*, Btl., p. 648, Pl. XXV. 3 ...	...	62	...	15	...	...	
31	...	Endrosis, Hb., p. 648							
	324	1 *lactella*, Schiff., p. 649	...	...	...	...	...	85	Europe, W. Asia, Madeiras, S. Africa, N. America, Australia, New Zealand
32	...	Oecia, Wlsm., p. 649							
	325	1 *maculata*, Wlsm., p. 649, Pl. XXV. 4	...	...	...	...	...	...	Hawaiia (*Ins.?*), Brazil, W. Indies
33	...	Mapsidius, W., p. 650							
	326	1 *auspicata*, W., p. 650, Pl. XXV. 5 ...	109	...	...	16	...	...	
	327	2 *quadridentata*, W., p. 651, Pl. XXV. 6	...	...	...	17	...	...	
	328	3 *iridescens*, W., p. 651, Pl. XXV. 7 ...	110	...	...	...	...	...	
34	...	Prays, Hb., pp. 651, 735							
	329	1 *fulvocanellus*, W., pp. 652, 735, Pl. XXV. 8—10	111	63	78	18	84	86	
35	...	Plutella, Schrank, p. 652							
	330	1 *maculipennis*, Crt., p. 652	112	...	79	...	...	87	Europe, Asia, Africa, N. and S. America, Australia, New Zealand, Oceania
	331	2 *albovenosa*, W., p. 653, Pl. XXV. 11	...	64	...	...	...	88	
		IV. CARPOSINIDAE, pp. 654, 735.							
36	...	Heterocrossa, Meyr., pp. 654, 735							
	332	1 *plumbeonitida*, W., p. 654, Pl. XII. 11	113	...	...	...	...	...	
	333	2 *graminicolor*, W., p. 654, Pl. XII. 12	114	...	...	...	...	...	
	334	3 *olivaceonitens*, W., p. 655, Pl. XII. 13	115	...	...	...	...	...	
	335	4 *subolivacea*, W., p. 655, Pl. XII. 14	...	...	...	19	...	...	
	336	5 *viridis*, W., p. 656, Pl. XII. 15 ...	116	...	...	...	...	...	
	337	6 *nigronotata*, W., p. 656, Pl. XII. 16	...	...	...	...	...	89	
	338	7 *crinifera*, W., p. 657, Pl. XII. 17 ...	...	65	80	...	...	...	
	339	8 *herbarum*, W., pp. 658, 735, Pl. XII. 18	...	66	...	20	...	...	
	340	9 *graminis*, W., p. 658, Pl. XII. 19 ...	117	...	...	...	...	...	
	341	10 *tincta*, W., p. 659, Pl. XII. 20 ...	118	...	...	21	...	90	
	342	11 *gemmata*, W., p. 660, Pl. XII. 21 ...	...	...	...	...	...	91	
	343	12 *subumbrata*, W., pp. 660, 735, Pl. XII. 22	...	67	...	...	...	...	
	344	13 *bicincta*, W., p. 661, Pl. XII. 23 ...	...	...	81	...	...	...	
	345	14 *dispar*, W., p. 661, Pl. XII. 24 ...	...	...	...	...	...	92	
	346	15 *pygmaeella*, W., p. 662	...	...	...	...	...	93	
	347	16 *latifasciata*, W., p. 662, Pl. XII. 25	...	...	...	...	...	94	
	348^a	17^a *corticella*, W. + *semitogata*, W., p. 662, Pl. XII. 26	119^a	...	...	...	...	...	
	348^b	17^b *corticella*, W. + *piperatella*, W., p. 663, Pl. XII. 27	119^b	...	...	...	...	...	
	348^c	17^c *corticella*, W. + *corticella*, W., p. 664, Pl. XII. 28	119^c	68	82	...	...	...	
	349	18 *ferruginea*, W., p. 664, Pl. XIII. 1	...	...	83	...	...	...	
	350	19 *togata*, W., p. 665, Pl. XIII. 2 ...	...	...	...	...	85	...	
	351	20 *divaricata*, W., p. 665, Pl. XIII. 3	120	...	...	...	...	...	

Genus	Species		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Distribution
36	...	HETEROCROSSA (*contd.*)							
	352	21 *nigromaculata*, W., pp. 666, 735, Pl. XIII. 4	...	69	...	...	...	...	
	353	22 *distincta*, W., p. 666, Pl. XIII. 5	121	...	...	...	...	...	
	354	23 *cervinella*, W., p. 667, Pl. XIII. 6	122	...	...	...	...	...	
	355	24 *mauii*, W., p. 668, Pl. XIII. 7	...	...	...	...	86	...	
	356	25 *irrorata*, W., p. 668, Pl. XIII. 8	...	...	...	22	...	...	
	357	26 *atronotata*, W., p. 669, Pl. XIII. 9	...	...	...	...	87	...	
	358	27 *inscripta*, W., p. 669, Pl. XIII. 10	...	...	...	...	...	95	
	359	28 *pusilla*, W., pp. 670, 735, Pl. XIII. 11	...	70	...	...	...	...	
	360	29 *trigononotata*, W., p. 670, Pl. XIII. 12	...	...	84	...	88	...	
	361	30 *punctulata*, W., p. 671, Pl. XIII. 13	...	...	85	...	...	...	
	362	31 *achroana*, Meyr., p. 671, Pl. XIII. 14	...	...	...	...	...	96	
	363	32 *solutella*, W., p. 672, Pl. XIII. 15	...	...	...	...	...	97	
	364	33 *gracillima*, W., p. 672, Pl. XIII. 16	123	...	86	...	89	98	
		V. TORTRICIDAE, pp. 673, 735							
		I. **OLETHREUTINAE**, p. 673							
37	...	ECCOPTOCERA, W., pp. 673, 735							
	365	1 *foetorivorans*, Btl., pp. 674, 735, Pl. X. 12—14	124	71	87	23	90	99	
38	...	CROCIDOSEMA, Z., pp. 675, 736							
	366	1 *plebeiana*, Z., pp. 675, 736, Pl. X. 15	125	72	88	24	91	100	Europe, Australia, W. Indies, C. and S. America, Madeiras, Canaries
39	...	GYPSONOMA, Meyr., pp. 676, 736							
	367	1 *leprarum*, W., pp. 676, 736, Pl. X. 16	...	73	89	...	...	...	
40	...	ADENONEURA, W., p. 677							
	368	1 *falsifalcellum*, W., p. 677, Pl. X. 17	...	...	...	...	...	101	
	369	2 *marcidellum*, W., p. 678, Pl. X. 18	...	74	...	...	...	...	
	370	3 *plicatum*, W., p. 678, Pl. X. 19	...	...	...	...	...	102	
	371	4 *latifemoris*, W., p. 679, Pl. X. 20	...	...	...	...	92	103	
	372	5 *montanum*, W., p. 679, Pl. X. 21	...	...	...	...	...	104	
	373	6 *rufipennis*, Btl., p. 680, Pl. X. 22	126	75	...	...	...	...	
41	...	CRYPTOPHLEBIA, Wlsm., p. 680							
	374^a	1^a *illepida*, Btl. + *illepida*, Btl., p. 681, Pl. X. 23	...	76^a	...	...	...	105^a	
	374^b	1^b *illepida*, Btl. + *fulva*, W., p. 681, Pl. X. 24	...	76^b	...	...	...	105^b	
	374^c	1^c *illepida*, Btl. + *suffusa*, W., p. 682, Pl. X. 25	...	...	...	...	...	105^c	
	375	2 *tetrao*, W., p. 683, Pl. X. 26	...	...	...	...	...	106	
	376	3 *vulpes*, W., p. 683, Pl. X. 27	...	...	...	...	...	107	
42	...	ENARMONIA, Hb., pp. 683, 736							
	377	1 *conspicua*, W., p. 684, Pl. X. 28	...	...	...	...	93	...	
	378	2 *walsinghami*, Btl., pp. 684, 736, Pl. XI. 1	...	77	...	...	...	108	
	379	3 *crassicornis*, W., p. 685, Pl. XI. 2	...	...	...	...	...	109	
	380	4 *storeella*, W., p. 686, Pl. XI. 3	...	...	...	...	94	...	
	381	5 *obliqua*, W., p. 686, Pl. XI. 4	...	...	...	...	...	110	
43	...	BACTRA, Stph., p. 687							
	382	1 *straminea*, Btl., p. 687, Pl. XI. 5	127	78	90	25	95	111	
		II. **TORTRICINAE**, p. 689							
44	...	PARARRHAPTICA, W., p. 689							
	383	1 *perkinsana*, W., p. 689, Pl. XI. 6	...	...	91	...	96	...	
45	...	ARCHIPS, Hb., pp. 690, 736							
	384	1 *postvittanus*, Wkr., pp. 690, 736, Pl. XI. 7	128	79	...	...	...	...	Australia, New Caledonia

Genus	Species		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Distribution
45	...	ARCHIPS (*contd.*)							
	385	2 *longiplicatus*, W., pp. 691, 736, Pl. XI. 8	...	80	...	26	97	112	
	385:1	2 : 1 *capucinus*, W. (398 *capucina*, W., p. 701), Pl. XI. 23, p. 736	...	81	92	...	...	113	
	386	3 *leopardellus*, W., p. 692, Pl. XI. 9 ...	129	...	...	...	...	...	
	387	4 *punctiferanus*, W., p. 692, Pl. XI. 10 ...	...	...	93	...	98	...	
	388	5 *trochilidanus*, W., p. 693, Pl. XI. 11 ...	...	...	94	...	...	...	
	389	6 *fuscoviridis*, W., p. 693, Pl. XI. 12 ...	...	82	...	27	...	...	
	390	7 *lichenoides*, W., p. 694, Pl. XI. 13 ...	...	...	...	...	...	114	
	391	8 *subsenescens*, W., p. 695, Pl. XI. 14 ...	...	...	95	...	...	...	
46	...	PANAPHELIX, W., p. 695							
	392	1 *marmorata*, W., p. 696, Pl. XI. 15—16	...	...	...	...	99	...	
47	...	DIPTERINA, Meyr., p. 697							
	393	1 *fulvosericea*, W., p. 697, Pl. XI. 17—18	130	83	96	28	...	...	
48	...	TORTRIX, L., pp. 698, 736							
	394	1 *chlorocalla*, W., p. 699, Pl. XI. 19 ...	...	...	...	...	...	115	
	395	2 *metallurgica*, W., p. 699, Pl. XI. 20 ...	...	...	97	29	...	...	
	396	3 *thoracina*, W., p. 700, Pl. XI. 21 ...	131	...	...	...	...	...	
	397	4 *falerniana*, W., p. 701, Pl. XI. 22 ...	...	...	98	...	...	...	
	[398 =	5 *capucina*, W., pp. 701, 736, Pl. XI. 23 385 : 1 *Archips capucinus*, W., p. 736 ...	...	81	92	...	...	113]	
	399	6 *rubiginis*, W., p. 702, Pl. XI. 24 ...	...	84	...	...	...	...	
49	...	CAPUA, Stph., p. 703							
	400	1 *flavopicta*, W., p. 703, Pl. XI. 25 ...	132	...	...	...	...	...	
	401	2 *picta*, W., p. 703, Pl. XI. 26	133	...	...	...	...	...	
	402	3 *flavocincta*, W., p. 704, Pl. XI. 27 ...	...	...	...	...	...	116	
	403	4 *trigonifer*, W., p. 704, Pl. XI. 28 ...	...	...	...	...	...	117	
	404	5 *pleonectes*, W., p. 705, Pl. XII. 1 ...	...	...	...	...	...	118	
	405	6 *castaneana*, W., p. 705, Pl. XII. 2 ...	134	...	...	...	..	...	
	406	7 *glaucoviridana*, W., p. 706, Pl. XII. 3	135	...	...	...	...	...	
	407	8 *variabilis*, W., p. 706, Pl. XII. 4 ...	...	...	99	...	100	...	
	408	9 *ochreocuprea*, W., p. 708, Pl. XII. 5 ...	136	...	...	...	...	...	
	409	10 *fulva*, W., p. 708, Pl. XII. 6	137	...	...	...	...	...	
50	...	EPAGOGE, Hb., p. 709							
	410	1 *infaustana*, W., p. 709, Pl. XII. 7 ...	138	...	100	...	101	119	
	411	2 *xanthogona*, W., p. 710, Pl. XII. 8 ...	...	...	...	...	...	120	
	412	3 *pernitida*, W., p. 710, Pl. XII. 9 ...	...	...	...	...	...	121	
	413	4 *argentinotata*, W., p. 711, Pl. XII. 10	...	...	...	...	...	122	
		VI. TINEIDAE, pp. 711, 737							
51	...	OPOSTEGA, Z., p. 711							
	414	1 *maculata*, W., p. 711, Pl. XXV. 12 ...	...	...	101	...	...	...	
	415	2 *dives*, W., p. 711, Pl. XXV. 13 ...	139	...	...	...	...	...	
52	...	OPOGONA, Z., pp. 712, 737							
	416	1 *aurisquamosa*, Btl., pp. 713, 737, Pl. XXV. 14	140	85	102	30	...	123	Marquesas Is., Society Is.
53	...	EREUNETIS, Meyr., pp. 714, 737							
	417	1 *simulans*, Btl., pp. 715, 737, Pl. XXV. 15	...	86	...	...	...	...	Marquesas Is., Fiji
	418	2 *zebrina*, Btl., p. 715, Pl. XXV. 16 ...	...	87	...	...	...	...	
	419	3 *minuscula*, Wlsm., pp. 716, 737, Pl. XXV. 17	...	88	...	...	...	124	West Indies, [? Colombia]
	420	4 *flavistriata*, W., p. 716, Pl. XXV. 18	...	...	...	31	...	...	
54	...	PHILODORIA, W., pp. 717, 737							
	421	1 *succedanea*, W., p. 717, Pl. XXV. 19 ...	?	...	...	...	102	...	
	422	2 *auromagnifica*, W., p. 718, Pl. XXV. 20	...	89	...	...	...	...	
	423	3 *floscula*, W., p. 718, Pl. XXV. 21 ...	...	...	...	...	...	125	
	424	4 *micropetala*, W., p. 719, Pl. XXV. 22	141	...	...	...	...	...	
	425	5 *splendida*, W., pp. 719, 737, Pl. XXV. 23	142	90	103	32	...	...	

Genus	Species		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Distribution
54	...	PHILODORIA (*contd.*)							
	426	6 *basalis*, W., p. 720, Pl. XXV. 24	...	...	...	...	103	...	
	427	7 *nigrella*, W., p. 721, Pl. XXV. 25	...	...	...	...	...	126	
55	...	GRACILARIA, Hw., p. 721							
	428	1 *marginestrigata*, W., p. 721, Pl. XXV. 26	143	91	104	...	...	...	
	429	2 *epibathra*, W., p. 722, Pl. XXV. 27	...	...	105	...	...	...	
56	...	BEDELLIA, Stn., p. 723							
	430	1 *somnulentella*, Z., p. 723, Pl. XXV. 28	...	...	...	...	...	127	Europe, Canaries, Madeiras, United States, Australia, New Zealand
	431	2 *minor*, Busck, p. 724	...	92	106	...	...	128	Florida
	432	3 *struthionella*, W., p. 725	...	93	...	...	...	129	
	433	4 *orchilella*, W., p. 725	144	94	...	...	...	130	
57	...	SETOMORPHA, Z., p. 726							
	434	1 *rutella*, Z., n. synn. = *dryas*, Btl., p. 726 = *rupicella*, Z.; *operosella*, Z.; *inamoenella*, Z.; = *ruderella*, Z.; *multimaculella*, Chmb.; = *corticinella*, Snln.; *discipunctella*, Rbl.	...	95	...	...	...	131	N. and S. America, W. Indies, Canaries, W. and S. Africa, India, Ceylon, Celebes
58	...	ACROLEPIA, Crt., p. 726							
	435	1 *aureonigrella*, W., p. 727	...	...	107	...	...	...	
59	...	MONOPIS, Hb., pp. 727, 737							
	436	1 *monachella*, Hb., p. 727	...	96	...	33	...	132	Europe, India, Burmah, Ceylon, W. and S. Africa
	437	2 *crocicapitella*, Clms., pp. 728, 737	...	97	108	34	...	133	Europe, Canaries, U.S.
	438	3 *obumbrata*, Btl., p. 728	...	98	...	...	...	...	
60	...	TINEA, L., p. 729							
	439	1 *fuscipunctella*, Hw., p. 729	...	...	...	...	...	134	Europe, W. Asia, N., W. and S. Africa, N. America, Labrador, Australia, New Zealand
61	...	PARAPHASIS, W., p. 730							
	440	1 *perkinsi*, W., p. 730	145	...	...	...	...	...	
62	...	(7 : 1) GELECHIA, Hb., p. 731							
	441	(21 : 1) *gossypiella*, Sndrs., p. 731							
62	441	Totals	145	98	108	34	103	134	

Summary of the above list.

	ENDEMIC					APODEMIC	Total
	Walker	Butler	Meyrick	Wlsm.	Total	Auct.	
Genera ...	...	3	3	20	26	36	62
Species ...	1	28	5	386	420	21	441
Subspecies	...	...	...	13	13	...	13

FAMILY TYPE.

The impression produced is that generalised (archaic) forms are absent from Hawaiia: the fauna is a specialised one, but derived from now extinct palaeomorphs. Evolution in Hawaiia has taken place in a manner locally peculiar, and correlation with other faunae seems impossible, owing to the extinction of those forms from which the faunae of Australia and New Zealand were likewise derived on diverging lines, the points of divergence having been eliminated.

GENERA.

26 Genera are endemic, of which *Hyposmocoma*, Btl., contains no less than 177 species; 36 are apodemic (Total 62). Of the apodemic genera five only present points for consideration, the others being widely distributed, and of no local interest.

		S. America	N. America	W. Indies	Pacifica	Hawaiia	Australia
1	*Ereunetis*, Meyr.	?	...	*	*	*	*
2	*Stoeberhinus*, Btl.	...	...	...	*	*	...
3	*Autosticha*, Meyr.	...	...	...	*	*	...
4	*Lineodes*, Gn. ...	*	*	*	...	*	...
5	*Oecia*, Wlsm. ...	*	*	*	...	*	...

Oecia may be dismissed as a domestic species, introduced by commerce, probably viâ San Francisco.

Lineodes (*Pyralidina*, not properly a micro, *vide* p. 469), has not yet been recognised in Australia or the Pacific and is the only really American element in the entire fauna—it can at most be regarded as a mere straggler.

Ereunetis, *Stoeberhinus*, and *Autosticha* are Pacifican morphs, the first extending to the West Indies, and perhaps occurring in Colombia.

The endemic genera are of Pacifican origin, and comparison would be made with Australian, or New Zealand, geneomorphs; *Eccoptocera* is allied to the North American *Proteopteryx*, Wlsm., but it is equally allied to the Australian genera *Strepsicrates*, Meyr. (which has been recorded from the West Indies, and occurs also in the United States and the Canaries), *Bathrotoma*, Meyr., etc.

SPECIES.

The following is a careful analysis of the 441 species as now recorded from Hawaiia: of these 420 are endemic and 21 apodemic. 336 endemic and 8 apodemic

(= 344) species are confined to single Islands, while 85 endemic, and 12 apodemic (= 97) species occur in more than one Island. Five species *Hyposmocoma lupella,* Wlsm., *Prays fulvocanellus,* Wlsm., *Eccoptocera foetorivorans,* Btl., *Crocidosema plebeiana,* Z., and *Bactra straminea,* Btl. occur in each island, of these *Crocidosema plebeiana* is apodemic.

Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Endemic	Apodemic	Total	Total
*	*	*	*	*	*	4	1	5	
*	*	*	*	...	*	2	1	3	
*	*	*	...	*	*	1	...	1	
*	*	*	...	...	*	2	2	4	
*	*	...	...	...	*	4	...	4	
*	...	*	*	*	*	1	...	1	
*	...	*	*	...	*	1	...	1	
*	...	*	...	*	*	3	...	3	
*	...	*	...	...	*	2	1	3	
*	...	...	*	...	*	1	...	1	
*	...	...	...	...	*	2	...	2	
*	*	*	*	*	...	...	1	1	
*	*	*	...	*	...	1	...	1	
*	*	...	...	*	...	1	...	1	
*	...	...	...	*	...	3	...	3	
*	*	*	*	...	...	2	...	2	
*	...	...	*	...	...	1	...	1	
*	*	*	...	...	...	5	...	5	
*	...	*	...	...	...	3	...	3	
*	*	...	...	...	...	3	1	4	
*	...	...	...	...	...	96	...	96	145
...	*	*	*	...	*	...	1	1	
...	*	*	...	*	*	1	...	1	
...	*	*	...	...	*	5	...	5	
...	*	...	*	*	*	1	...	1	
...	*	...	*	...	*	...	1	1	
...	*	...	...	...	*	10	2	12	
...	*	*	...	*	...	...	1	1	
...	*	...	...	*	...	1	...	1	
...	*	...	*	...	...	4	...	4	
...	*	*	...	...	...	4	...	4	
...	*	...	...	...	...	34	2	36	67
...	...	*	...	...	*	2	...	2	
...	...	*	...	*	...	8	...	8	
..	...	*	*	...	...	2	...	2	
...	...	*	...	...	...	51	...	51	63
...	...	...	*	...	...	10	...	10	10
...	...	...	...	*	*	5	...	5	
...	...	...	...	*	...	70	...	70	75
...	..	...	...	...	*	75	3	78	78
?	?	?	?	?	?	2	1	3	3
								441	441

Summarising the above we obtain the following results :

	Species occurring in one island only			Species occurring in more than one island			Total of species occurring in each island
	Endemic	Apodemic	Total	Endemic	Apodemic	Total	
Kauai ...	96	...	96	42	7	49	145
Oahu ...	34	2	36	51	11	62	98
Molokai	51	...	51	48	9	57	108
Lanai ...	10	...	10	19	5	24	34
Maui ...	70	...	70	30	3	33	103
Hawaii ...	75	3	78	47	9	56	134
(Island ?)	...	3	3	...	...	...	3
HAWAIIA	336	8	344	85	12	97	441

The following is the distribution of the 21 apodemic species :

	Hawaiia		S. America	N. America	W. Indies	Africa	Europe	Asia	Celebes	New Guinea	Australia	New Zealand	New Caledonia	Fiji	Society Is.	Marquesas Is.	Pitcairn Id.	Hawaiia
1	330	*Plutella maculipennis*, Crt. ...	*	*	*	*	*	*	...	...	*	*	...	...	...	...	...	*
2	366	*Crocidosema plebeiana*, Z. ...	*	*	*	*	*	*	...	...	*	...	...	...	..	...	...	*
3	324	*Endrosis lactella*, Schiff. ...	...	*	...	*	*	*	...	...	*	*	...	...	...	...	...	*
4	21	*Phthorimaea operculella*, Z. ...	*	*	*	*	*	...	...	...	*	*	...	...	...	...	...	*
5	439	*Tinea fuscipunctella*, Hw. ...	...	*	...	*	*	*	...	...	*	*	...	...	...	...	...	*
6	430	*Bedellia somnulentella*, Z. ...	...	*	...	...	*	...	...	...	*	*	...	...	...	...	...	*
7	434	*Setomorpha rutella*, Z. ...	*	*	*	*	...	*	*	...	...	...	...	...	...	...	...	*
8	436	*Monopis monachella*, Hb. ...	...	*	...	*	*	*	...	...	...	...	...	...	...	...	...	*
9	3	*Trichoptilus oxydactylus*, Wkr.	...	?	*	...	...	*	...	*	*	...	...	...	...	...	...	*
10	437	*Monopis crocicapitella*, Clms.	...	*	...	(Is.)	*	...	...	...	...	...	...	...	...	...	...	*
11	325	*Oecia maculata*, Wlsm. ...	*	...	*	...	...	...	...	...	...	...	...	...	...	...	...	*
12	419	*Ereunetis minuscula*, Wlsm.	?	...	*	...	...	...	...	...	...	...	...	...	...	...	...	*
13	4	*Platyptilia fuscicornis*, Z. ...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*
14	431	*Bedellia minor*, Busck ...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	*
15	21: 1	*Gelechia gossypiella*, Sndrs. ...	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	*
16	71	*Stagmatophora quadrifasciata*, W.	...	...	...	...	...	...	...	*	...	...	...	...	...	...	...	*
17	384	*Archips postvittanus*, Wkr. ...	...	...	...	...	...	...	...	...	*	...	*	...	...	...	...	*
18	417	*Ereunetis simulans*, Btl. ...	...	...	...	...	...	...	...	...	...	...	...	*	...	*	...	*
19	416	*Opogona aurisquamosa*, Btl.	...	...	...	...	...	...	...	...	...	...	...	...	*	*	...	*
20	22	*Stoeberhinus testaceus*, Btl. ...	...	...	...	...	...	...	...	...	...	...	...	...	...	*	...	*
21	70	*Stagmatophora honorariella*, W.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	*	*

Crocidosema plebeiana, Z., *Trichoptilus oxydactylus*, Wkr., and *Setomorpha rutella*, Z., are widely distributed, and probably not artificially introduced.

Plutella maculipennis, Crt., is universally distributed, feeding on cabbages and other *Cruciferae*. It is difficult to determine the natural range of this species which has undoubtedly been extended by commerce—only if the larva feeds on no native Crucifer in Hawaiia would it be possible to demonstrate that the insect has been introduced, although probably this is the case.

Bedellia somnulentella, Z., and *minor*, Busck—These species feed on *Convolvulus* and *Ipomoea*; the former is widely distributed, the latter, which has been recently differentiated, was hitherto only known to occur in Texas. Two endemic species of *Bedellia* are found in Hawaiia, and others in Australia, it is therefore possible that these two have not been artificially introduced.

Phthorimaea operculella, Z., mines the leaves of Tobacco, and bores into the tubers of the Potato, causing serious damage. It is now widely distributed, and carefully weighing the evidence deducible from the long list of references given under this species (pp. 483—4), it would appear to have originated in the United States, where it feeds also on other *Solanaceae*, and was doubtless introduced to the Islands viâ San Francisco.

Gelechia gossypiella, Sndrs., is noted by Mr. Perkins as an introduced species, highly injurious to Cotton, at Honolulu; it is recorded from India and Japan, but is not known to occur in America.

Tinea fuscipunctella, Hw., *Monopis crocicapitella*, Clms., *Monopis monachella*, Hb., *Endrosis lactella*, Schiff., and *Oecia maculata*, Wlsm., are domesticated species, doubtless introduced by commerce. *Oecia maculata*, hitherto only recorded from Brazil and the West Indies, is common in houses, having the same habits as *Endrosis lactella*—it probably ranges through Central America (a second species occurring in Costa Rica), and was not improbably introduced to the Islands from San Francisco, where it will doubtless be found. The American *Monopsis crocicapitella*, Clms., is now recognised as identical with a European species disguised under the synonyms *hyalinella*, Stgr., *lombardica*, Hrng., and *heringi*, Rdsn.; this also occurs in Tenerife.

Archips postvittanus, Wkr., is certainly an importation from Australia, where it is common and very variable; Mr. Perkins also notes its occurrence in New Caledonia. The late Francis Walker established a record when dealing with specimens of this species, describing them under 12 different idionyms distributed among 4 genera in two subfamilies of the *Tortricidae*.

Ereunetis minuscula, Wlsm., is from the West Indies (and probably Colombia), while *E. simulans*, Btl., occurs in the Marquesas and Fiji—other species are found in Australia, and allied genera in Malaysia and Africa, it would therefore appear that these forms are widely distributed, and it would be rash to assume that they have been introduced.

Platyptilia fuscicornis, Z., only hitherto recorded from Colombia, is probably more widely distributed, but confused with *cosmodactyla*, Hb., and *acanthodactyla*, Hb., this may, or may not have been introduced—evidence is wanting.

Stoeberhinus testaceus, Btl., *Opogona aurisquamosa*, Btl., and *Ereunetis simulans*, Btl., are Pacifican forms, all occurring in the Marquesas, *aurisquamosa* in the Society Islands, and *simulans* in Fiji.

The distribution of the remaining two species is peculiar, *Stagmatophora honorariella*, Wlsm., occurring in Pitcairn Island, while its close ally *Stagmatophora quadrifasciata*, Wlsm., is found in New Guinea.

Ethmia colonella, Wlsm., although not yet recorded elsewhere, has almost certainly been imported from Malaysia, but so much error has been introduced under the name "*hilarella*, Wkr.," which was the original record of this species from Hawaiia, that great caution is needed in tracing its derivation. Let it be noted that there are several yellow hind-winged forms of *Ethmia* allied to *colonella*, very closely related to each other, but distinct, and that **bicolorella*, Pgnstk. (nec Gn.), from Malaysia, appears to be identical with *colonella*.

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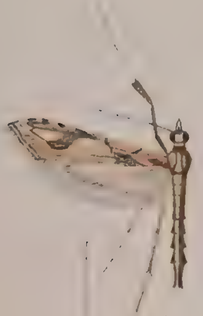
DESCRIPTION OF PLATE X. (VOL. I.)

MICROLEPIDOPTERA.

PYRALIDINA, PTEROPHORINA, ORNEODINA, TINEINA—TORTRICIDAE.

					PAGE
Fig.	1.	*Lineodes ochrea*	(Type ♀ 26723)	Kauai	469
,,	2.	,, *subextincta*	(Paratype ♂ 28671)	Kauai	470
,,	3.	*Trichoptilus oxydactylus*, Wkr.	(♂ 25040)	Oahu	471
,,	4.	*Platyptilia fuscicornis*, Z.	(♂ 25117)	Oahu	472
,,	5.	,, *brachymorpha*, Meyr.	(♂ 25789)	Hawaii	474
,,	6.	,, *rhynchophora*, Meyr.	(♂ 28457)	Maui	475
,,	7.	,, *insularis*	(Type ♂ 26142)	Molokai	475
,,	8.	,, *littoralis*, Btl.	(Type ♀ 169: 82. 9 Mus. Br.)	Oahu	476
,,	9.	,, ,, var.	(♂ 25194)	Hawaii	476
,,	10.	*Orneodes angustestriata*	(Type ♂ 26730)	Kauai	477
,,	11.	,, *objurgatella*	(Type ♀ 25087)	Oahu	477
,,	12.	*Eccoptocera foetorivorans*, Btl.	(♀ 27013)	Kauai	674
,,	13.	,, ,,	(♂ 28709)	Molokai	674
,,	14.	,, ,,	(♂ 28071)	Hawaii	674
,,	15.	*Crocidosema plebeiana*, Z.	(♂ 26481)	Lanai	675
,,	16.	*Gypsonoma leprarum*	(Type ♀ 26256)	Molokai	676
,,	17.	*Adenoneura falsifalcellum*	(Type ♂ 27506)	Hawaii	677
,,	18.	,, (?) *marcidellum*	(Type ♀ 25001)	Oahu	678
,,	19.	,, *plicatum*	(Type ♂ 25717)	Hawaii	678
,,	20.	,, *latifemoris*	(Type ♀ 28127)	Maui	679
,,	21.	,, *montanum*	(Type ♂ 27483)	Hawaii	679
,,	22.	,, *rufipennis*, Btl.	(♀ 25097)	Oahu	680
,,	23.	*Cryptophlebia illepida*, Btl. + *illepida*, Btl.	(♂ 25231)	Hawaii	681
,,	24.	,, ,, + *fulva*	(Type ♀ 25649)	Hawaii	681
,,	25.	,, ,, + *suffusa*	(Type ♂ 25184)	Hawaii	682
,,	26.	,, *tetrao*	(Type ♂ 25224)	Hawaii	683
,,	27.	,, *vulpes*	(Type ♂ 27465)	Hawaii	683
,,	28.	*Enarmonia* (?) *conspicua*	(Type ♀ 28134)	Maui	684

FAUNA HAWAIIENSIS. VOL. I. PLATE X.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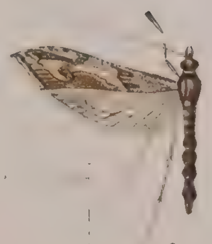
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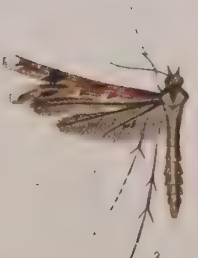
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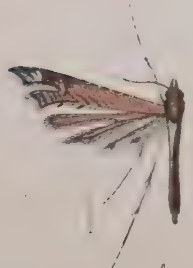
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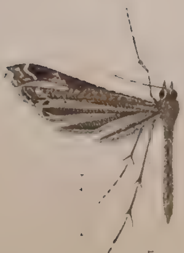
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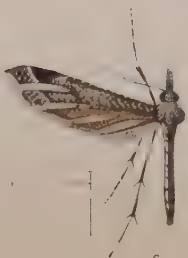
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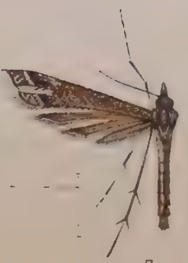
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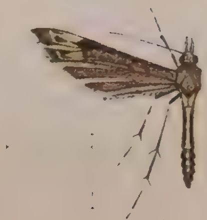
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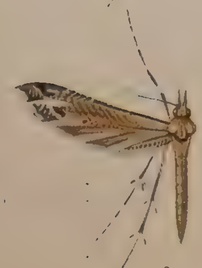
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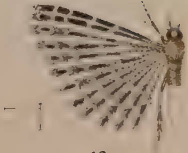
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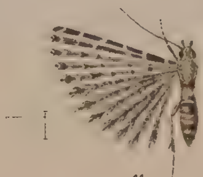
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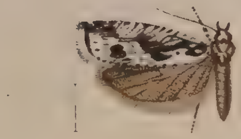
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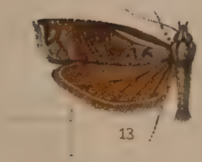
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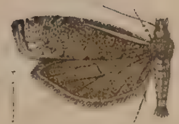
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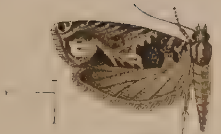
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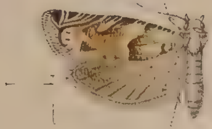
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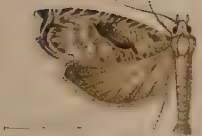
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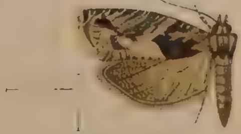
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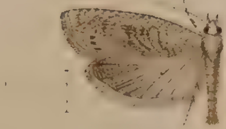
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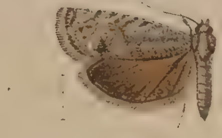
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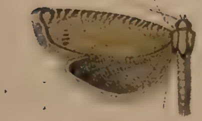
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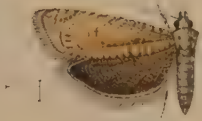
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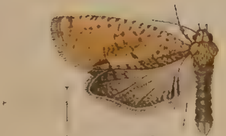
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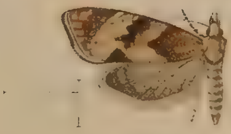
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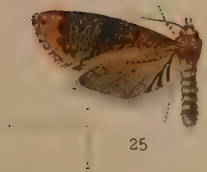
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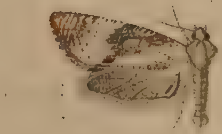
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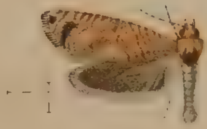
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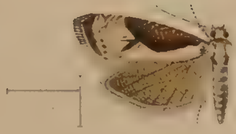
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F.W. Frohawk del. A.J. Wendel lith. P.W.M. Trap. Chromo. Leiden.

Lord Walsingham. Microlepidoptera.

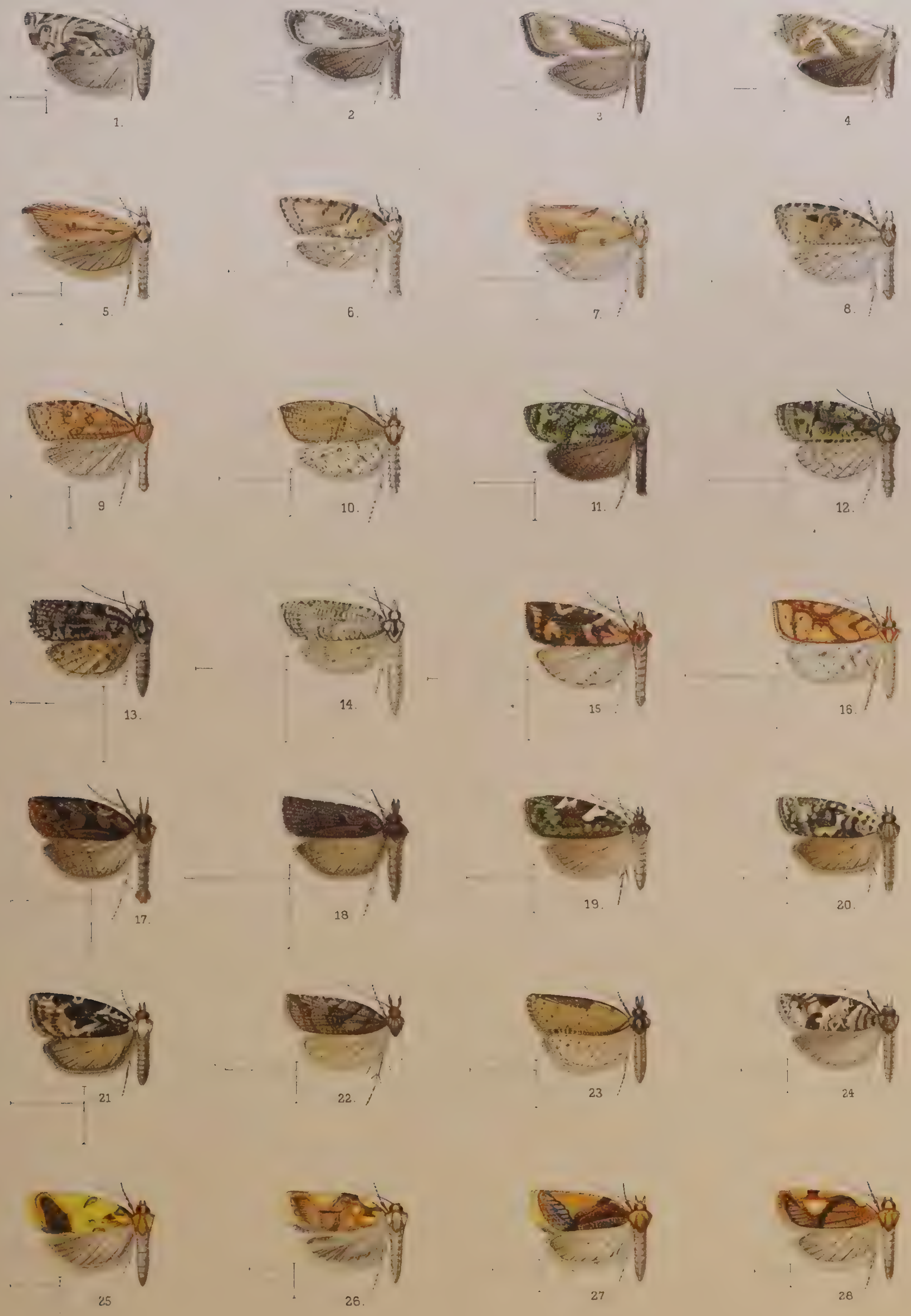
DESCRIPTION OF PLATE XI. (VOL. I.)

MICROLEPIDOPTERA.

TORTRICIDAE.

				PAGE
Fig. 1.	*Enarmonia walsinghami*, Btl.	(♀ 25555)	Hawaii	684
,, 2.	,, *crassicornis*	(Type ♂ 25212)	Hawaii	685
,, 3.	,, (?) *storeella*	(Type ♀ 28185)	Maui	686
,, 4.	,, (?) *obliqua*	(Type ♀ 25828)	Hawaii	686
,, 5.	*Bactra straminea*, Btl.	(♂ 25859)	Oahu	687
,, 6.	*Pararrhaptica perkinsana*	(Type ♂ 28174)	Maui	689
,, 7.	*Archips postvittanus*, Wkr.	(♀ 28002)	Kauai	690
,, 8.	,, *longiplicatus*	(Type ♂ 26604)	Maui	691
,, 9.	,, *leopardellus*	(Type ♂ 27678)	Kauai	692
,, 10.	,, *punctiferanus*	(Type ♂ 26581)	Maui	692
,, 11.	,, *trochilidanus*	(Type ♂ 25170)	Molokai	693
,, 12.	,, *fuscoviridis*	(Type ♂ 26412)	Lanai	693
,, 13.	,, (?) *lichenoides*	(Type ♀ 28064)	Hawaii	694
,, 14.	,, (?) *subsenescens*	(Type ♀ 26334)	Molokai	695
,, 15.	*Panaphelix marmorata*	(Type ♂ 26537)	Maui	696
,, 16.	,, ,, (+ *chrysochroa*)	(Type ♀ 26525)	Maui	697
,, 17.	*Dipterina fulvosericea*	(Type ♂ 25165)	Molokai	697
,, 18.	,, ,,	(Type ♀ 26801)	Kauai	697
,, 19.	*Tortrix chlorocalla*	(Type ♀ 28042)	Hawaii	699
,, 20.	,, *metallurgica*	(Type ♂ 26397)	Molokai	699
,, 21.	,, *thoracina*	(Type ♀ 26871)	Kauai	700
,, 22.	,, (?) *falerniana*	(Type ♀ 26076)	Molokai	701
,, 23.	*Archips capucinus* = *Tortrix* (?) *capucina*	(Type ♀ 26358)	Molokai	736 701
,, 24.	*Tortrix rubiginis*	(Type ♂ 28668)	Oahu	702
,, 25.	*Capua* (?) *flavopicta*	(Type ♀ 26791)	Kauai	703
,, 26.	,, *picta*	(Type ♂ 26771)	Kauai	703
,, 27.	,, (?) *flavocincta*	(Type ♀ 25182)	Hawaii	704
,, 28.	,, *trigonifer*	(Type ♂ 25181)	Hawaii	704

FAUNA HAWAIIENSIS. VOL. I. PLATE XI.



F.W. Frohawk del. A.J. Wendel lith. P.W.M. Trap. Chromo. Leiden.

Lord Walsingham. Microlepidoptera.

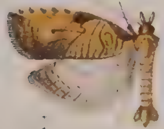
DESCRIPTION OF PLATE XII. (VOL. I.)

MICROLEPIDOPTERA.

TORTRICIDAE, CARPOSINIDAE.

					PAGE
Fig.	1.	*Capua pleonectes*	(Type ♂ 28070)	Hawaii	705
,,	2.	,, *castaneana*	(Type ♂ 27201)	Kauai	705
,,	3.	,, (?) *glaucoviridana*	(Type ♀ 27681)	Kauai	706
,,	4.	,, *variabilis*	(Type ♂ 26312)	Molokai	706
,,	5.	,, *ochreocuprea*	(Type ♂ 26931)	Kauai	708
,,	6.	,, *fulva*	(Type ♂ 27012)	Kauai	708
,,	7.	*Epagoge infaustana*	(Type ♀ 26945)	Kauai	709
,,	8.	,, (?) *xanthogona*	(Type ♀ 25358)	Hawaii	710
,,	9.	,, (?) *pernitida*	(Type ♀ 28641)	Hawaii	710
,,	10.	,, (?) *argentinotata*	(Type ♀ 27514)	Hawaii	711
,,	11.	*Heterocrossa plumbeonitida*	(Type ♂ 27576)	Kauai	654
,,	12.	,, *graminicolor*	(Paratype ♀ 27630)	Kauai	654
,,	13.	,, *olivaceonitens*	(Type ♀ 26927)	Kauai	655
,,	14.	,, *subolivacea*	(Type ♀ 26480)	Lanai	655
,,	15.	,, *viridis*	(Type ♀ 27259)	Kauai	656
,,	16.	,, *nigronotata*	(Type ♀ 28631)	Hawaii	656
,,	17.	,, *crinifera*	(Type ♂ 25163)	Molokai	657
,,	18.	,, *herbarum*	(Type ♀ 26477)	Lanai	658
,,	19.	,, *graminis*	(Type ♂ 27047)	Kauai	658
,,	20.	,, *tincta*	(Type ♀ 28041)	Hawaii	659
,,	21.	,, *gemmata*	(Type ♀ 28628)	Hawaii	660
,,	22.	,, *subumbrata*	(Type ♂ 25092)	Oahu	660
,,	23.	,, *bicincta*	(Type ♀ 26391)	Molokai	661
,,	24.	,, *dispar*	(Type ♀ 25678)	Hawaii	661
,,	25.	,, *latifasciata*	(Type ♀ 25352)	Hawaii	662
,,	26.	,, *corticella* + *semitogata*	(Type ♀ 27228)	Kauai	662
,,	27.	,, ,, + *piperatella*	(Paratype ♀ 27715)	Kauai	663
,,	28.	,, ,, + *corticella*	(Type ♂ 26838)	Kauai	664

FAUNA HAWAIIENSIS. VOL. I. PLATE XII.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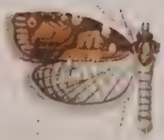
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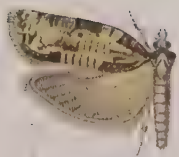
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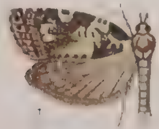
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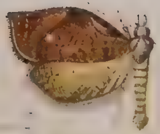
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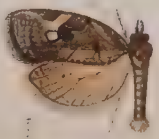
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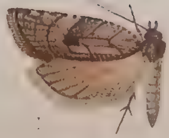
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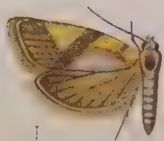
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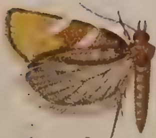
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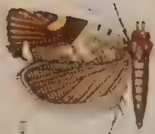
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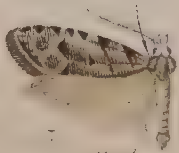
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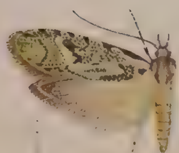
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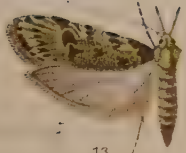
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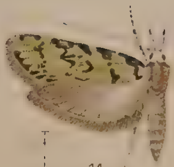
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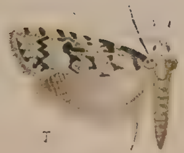
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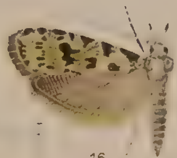
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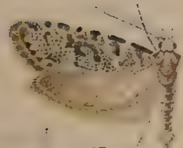
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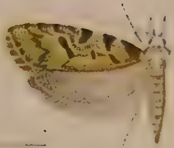
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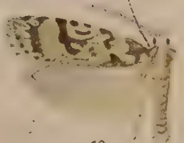
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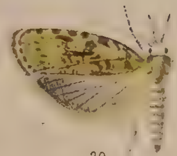
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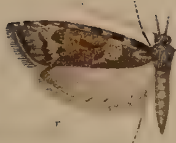
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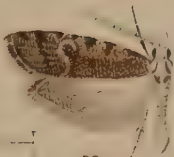
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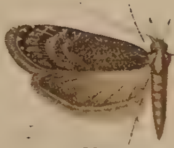
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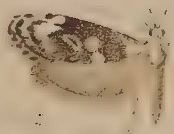
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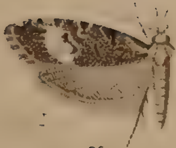
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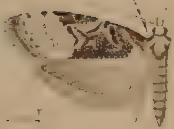
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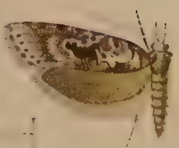
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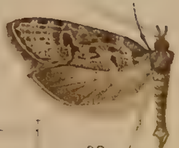
28.

F.W. Frohawk del. A.J. Wendel lith.

P.W.M. Trap. Chromo. Leiden.

Lord Walsingham. Microlepidoptera.

DESCRIPTION OF PLATE XIII. (VOL. I.)

MICROLEPIDOPTERA.

CARPOSINIDAE, GELECHIADAE.

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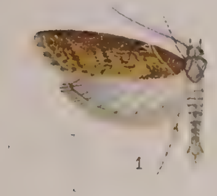
FAUNA HAWAIIENSIS. VOL. I. PLATE XIII.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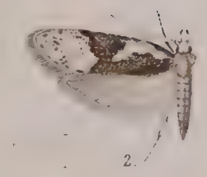
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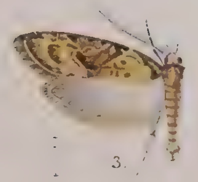
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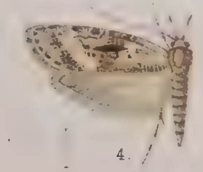
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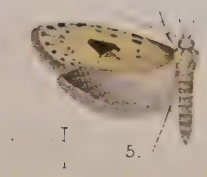
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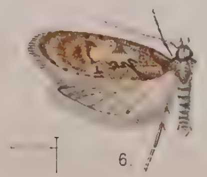
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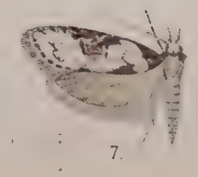
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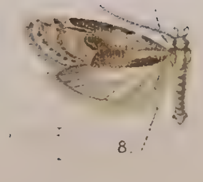
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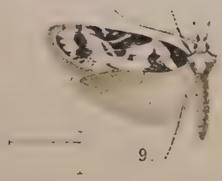
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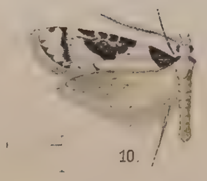
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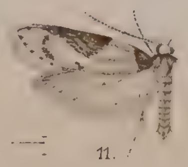
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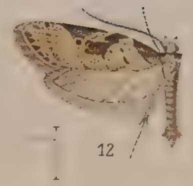
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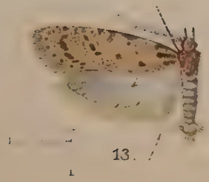
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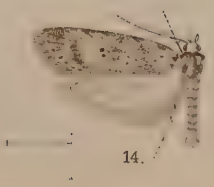
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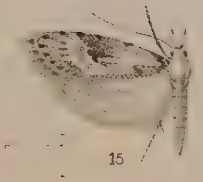
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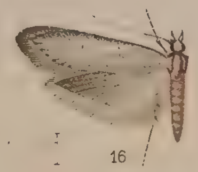
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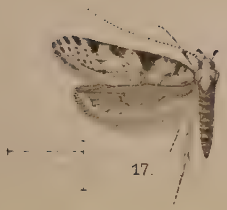
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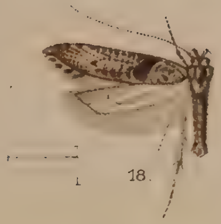
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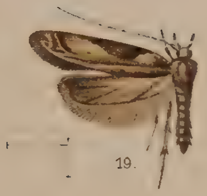
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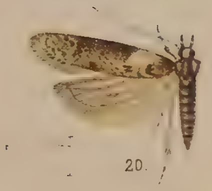
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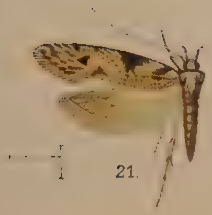
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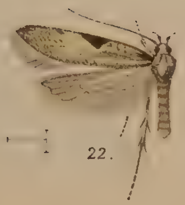
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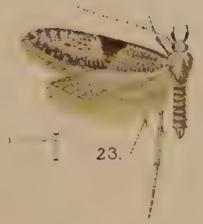
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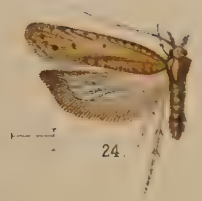
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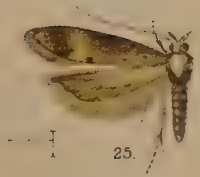
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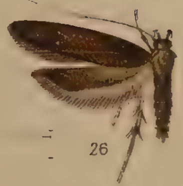
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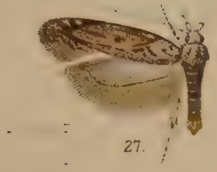
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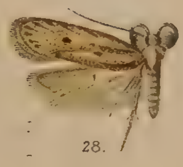
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F.W.Frohawk del. A.J.Wendel lith.

P.W.M.Trap. Chromo Leiden.

Lord Walsingham. Microlepidoptera.

DESCRIPTION OF PLATE XIV. (VOL. I.)

MICROLEPIDOPTERA.

GELECHIADAE.

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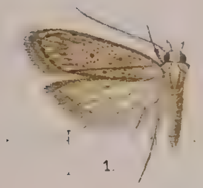
,, 27.	,, *inermis*	(Type ♂ 25320)	Hawaii	503
,, 28.	,, *usitata*, Btl.	(Type ♀ 69: 81. 7, Mus. Br.)	Oahu	504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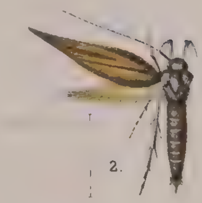
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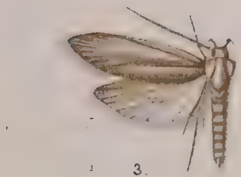
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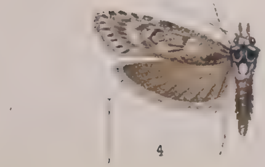
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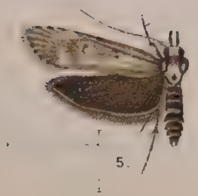
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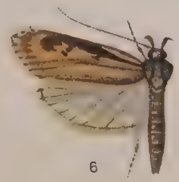
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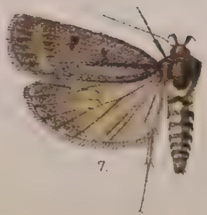
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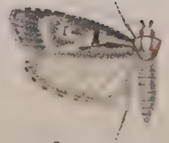
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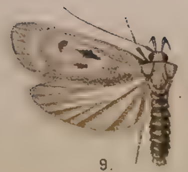
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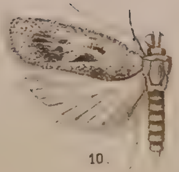
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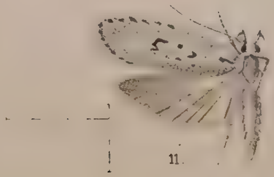
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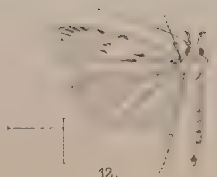
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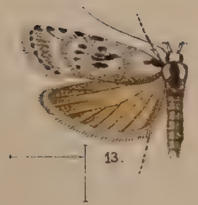
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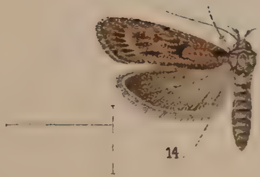
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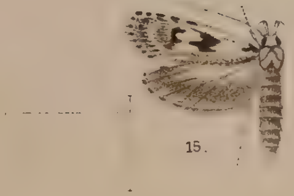
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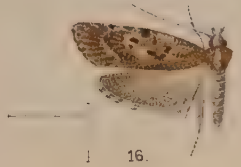
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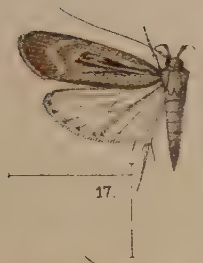
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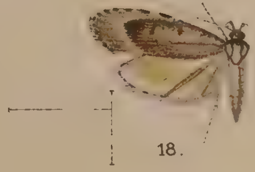
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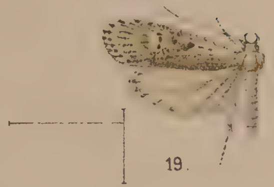
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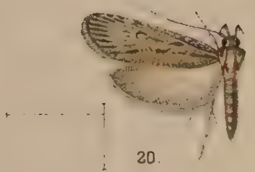
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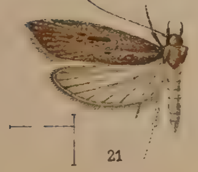
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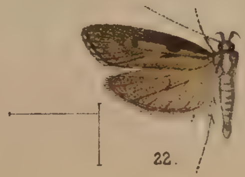
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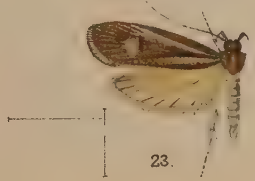
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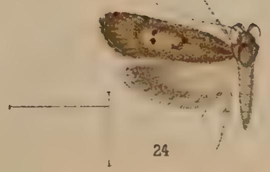
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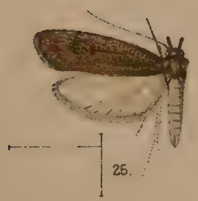
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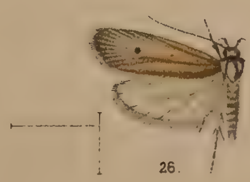
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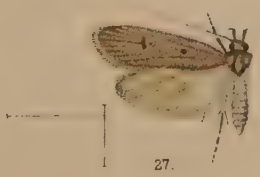
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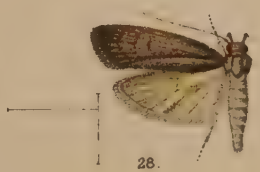
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F.W.Frohawk del. A.J.Wendel lith. P.W.M.Trap.Chromo.Leiden.

Lord Walsingham_Microlepidoptera.

DESCRIPTION OF PLATE XV. (VOL. I.)

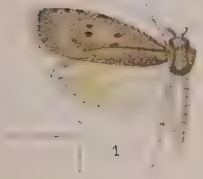
MICROLEPIDOPTERA.

GELECHIADAE, OECOPHORIDAE, HYPONOMEUTIDAE.

					PAGE
Fig.	1.	*Thyrocopa abusa*	(Type ♂ 3572, Mus. Meyr.)	*Hawaiia* (*Ins.* ?)	504
,,	2.	,, *subahenea*	(Type ♂ 26336)	Molokai	505
,,	3.	,, *leonina*	(Type ♂ 26434)	Lanai	505
,,	4.	,, (?) *geminipuncta*	(Type ♀ 26318)	Molokai	506
,,	5.	,, (?) *mediomaculata*	(Type ♀ 28125)	Maui	506
,,	6.	*Ethmia colonella*	(Type ♂ 28751)	Oahu	507
,,	7.	*Batrachedra syrraphella*	(Type ♂ 25862)	Oahu	509
,,	8.	,, *ephelus*	(Type ♂ 26199)	Molokai	509
,,	9.	,, *bedelliella*	(Type ♂ 26548)	Maui	509
,,	10.	,, *microstigma*	(Type ♂ 25141)	Oahu	510
,,	11.	,, *supercincta*	(Type ♂ 26543)	Maui	510
,,	12.	,, *ruficiliata*	(Type ♂ 25579)	Hawaii	510
,,	13.	,, *lomentella*	(Type ♂ 26013)	Oahu	511
,,	14.	,, *sophroniella*	(Type ♀ 25653)	Oahu	511
,,	15.	*Agonismus flavipalpis*	(Type ♀ 28468)	Maui	512
,,	16.	,, *coruscans*	(Type ♂ 25745)	Hawaii	513
,,	17.	,, *argentiferus*	(Type ♀ 27392)	Hawaii	513
,,	18.	*Elachista spilota*	(Type ♂ 28405)	Maui	513
,,	19.	,, *longisquamella*	(Type ♀ 25357)	Hawaii	514
,,	20.	*Stagmatophora* (*Proterocosma*) *incertulella*, Wkr.	(Caenotype ♀ 26577)	Maui	515
,,	21.	,, *honorariella*	(Type ♂ 2883)	Pitcairn Id.	515
,,	22.	,, *quadrifasciata*	(Type ♀ 71801)	Dinner Id. (New Guinea)	516
,,	23.	,, *sordidella*	(Type ♂ 26852)	Kauai	516
,,	24.	*Aphthonetus mediocris*	(Type ♂ 26619)	Maui	517
,,	25.	,, *fugitiva*	(Type ♂ 27857)	Kauai	518
,,	26.	,, *kauaiensis*	(Type ♂ 27534)	Kauai	518
,,	27.	,, *corticicolor*	(Type ♂ 26557)	Maui	519
,,	28.	,, *fluctuosa*	(Type ♂ 26758)	Kauai	519

FAUNA HAWAIIENSIS.

VOL. I. PLATE. XV.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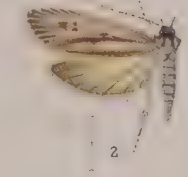
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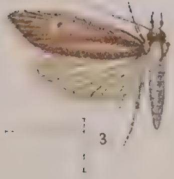
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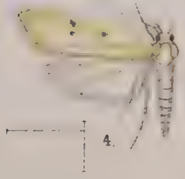
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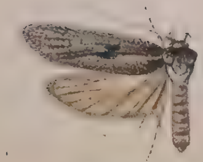
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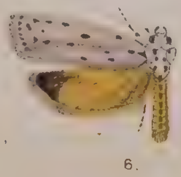
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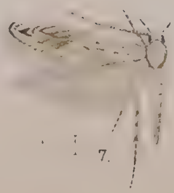
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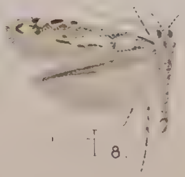
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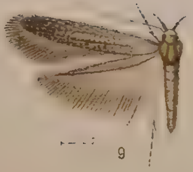
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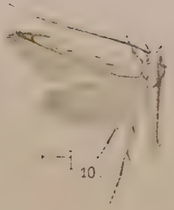
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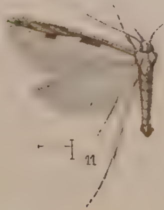
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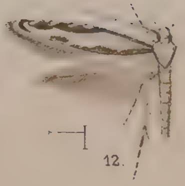
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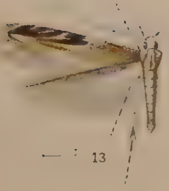
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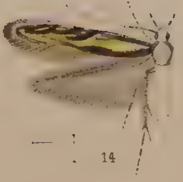
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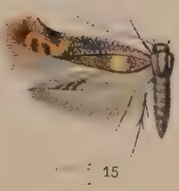
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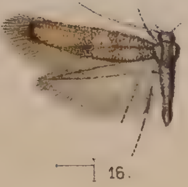
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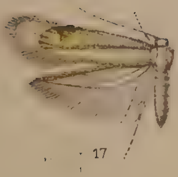
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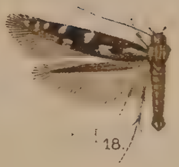
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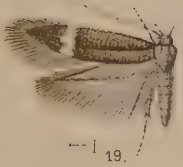
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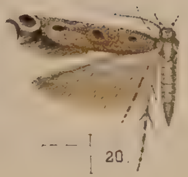
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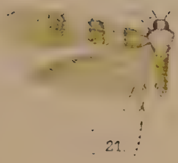
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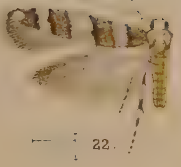
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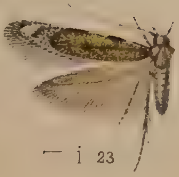
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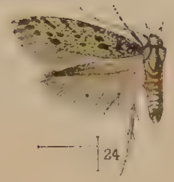
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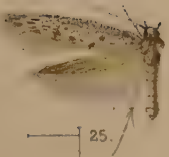
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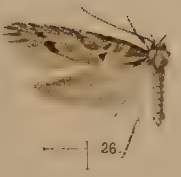
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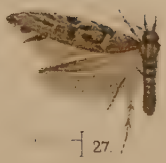
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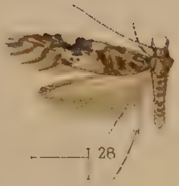
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F.W. Frohawk del. A.J. Wendel lith.

P.W.M. Trap. Chromo. Leiden.

Lord Walsingham. Microlepidoptera.

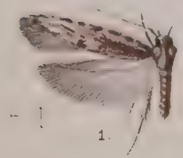
DESCRIPTION OF PLATE XVI. (VOL. I.)

MICROLEPIDOPTERA.

HYPONOMEUTIDAE.

					PAGE
Fig. 1.	*Aphthonetus*	*passerella*	(Type ♂ 26742)	Kauai	520
,, 2.	,,	*divergens*	(Type ♂ 26183)	Molokai	520
,, 3.	,,	*bitincta*	(Type ♂ 28484)	Maui	521
,, 4.	,,	*columbella*	(Type ♀ 26102)	Molokai	521
,, 5.	,,	*lichenalis*	(Type ♀ 26484)	Lanai	522
,, 6.	,,	*digressa*	(Type ♂ 28425)	Maui	522
,, 7.	,,	*eleuthera*	(Type ♀ 27385)	Hawaii	522
,, 8.	,,	*confusa*	(Type ♂ 28555)	Maui	523
,, 9.	,,	*spurcata*	(Type ♂ 28439)	Maui	523
,, 10.	,,	*plumbifer*	(Type ♂ 27039)	Kauai	524
,, 11.	,,	*trichophora*	(Type ♂ 26863)	Kauai	524
,, 12.	,,	*veterella*	(Type ♀ 27530)	Kauai	525
,, 13.	,,	*polia*	(Type ♂ 26876)	Kauai	525
,, 14.	,,	*subocellata*	(Type ♂ 28310)	Maui	526
,, 15.	,,	*nemo*	(Type ♂ 28317)	Maui	526
,, 16.	,,	*exsul*	(Type ♀ 27414)	Hawaii	526
,, 17.	,,	*albocinerea*	(Type ♀ 27169)	Kauai	527
,, 18.	,,	*diffusa*	(Type ♂ 26662)	Maui	527
,, 19.	,,	*hirsuta*	(Type ♀ 26729)	Kauai	528
,, 20.	,,	*humerella*	(Type ♀ 28237)	Maui	528
,, 21.	,,	*puncticiliata*	(Type ♂ 25746)	Hawaii	529
,, 22.	,,	*aspersa*, Btl.	(Type ♀ 106 : 82. 9, Mus. Br.)	*Hawaiia* (*Ins.* ?)	529
,, 23.	,,	*elegans*	(Type ♂ 28554)	Maui	530
,, 24.	,,	*sagittata*	(Type ♂ 26820)	Kauai	530
,, 25.	*Rhinomactrum*	*rutilellum*	(Type ♂ 26773)	Kauai	531
,, 26.	,,	(?) *scapulellum*	(Type ♀ 28061)	Hawaii	531
,, 27.	*Neelysia*	*cuprea*	(Type ♂ 27051)	Kauai	532
,, 28.	,,	*tigrina*, Btl.	(Type ♂ 120: 81. 7, Mus. Br.)	*Hawaiia* (*Ins.* ?)	533

FAUNA HAWAIIENSIS. VOL. I. PLATE. XVI.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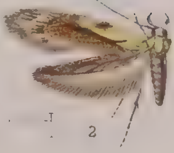
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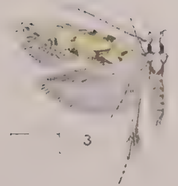
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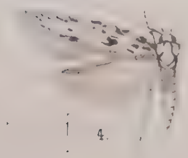
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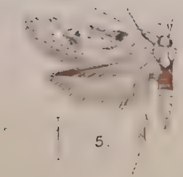
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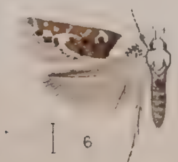
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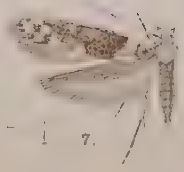
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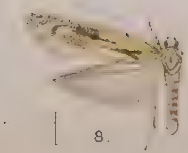
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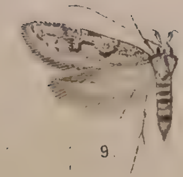
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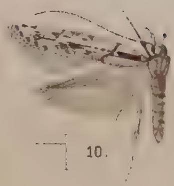
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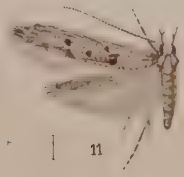
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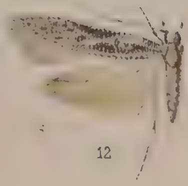
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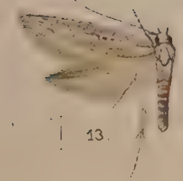
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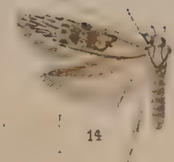
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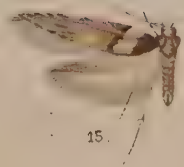
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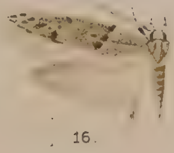
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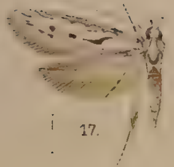
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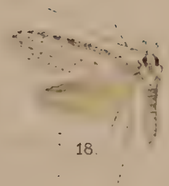
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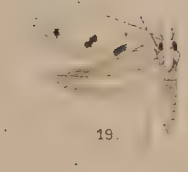
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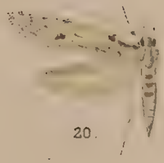
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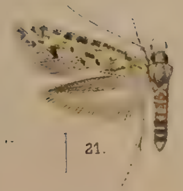
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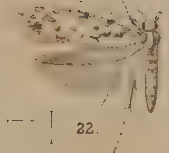
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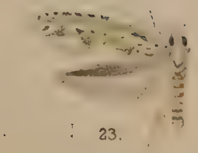
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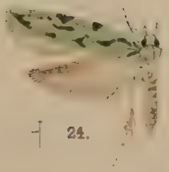
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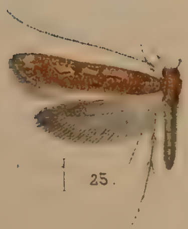
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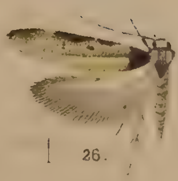
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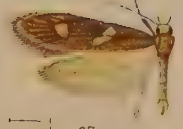
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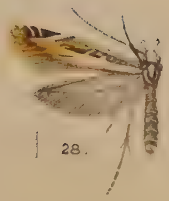
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F.W. Frohawk del. A.J. Wendel lith.

P.W.M. Trap. Chromo. Leiden.

Lord Walsingham. Microlepidoptera.

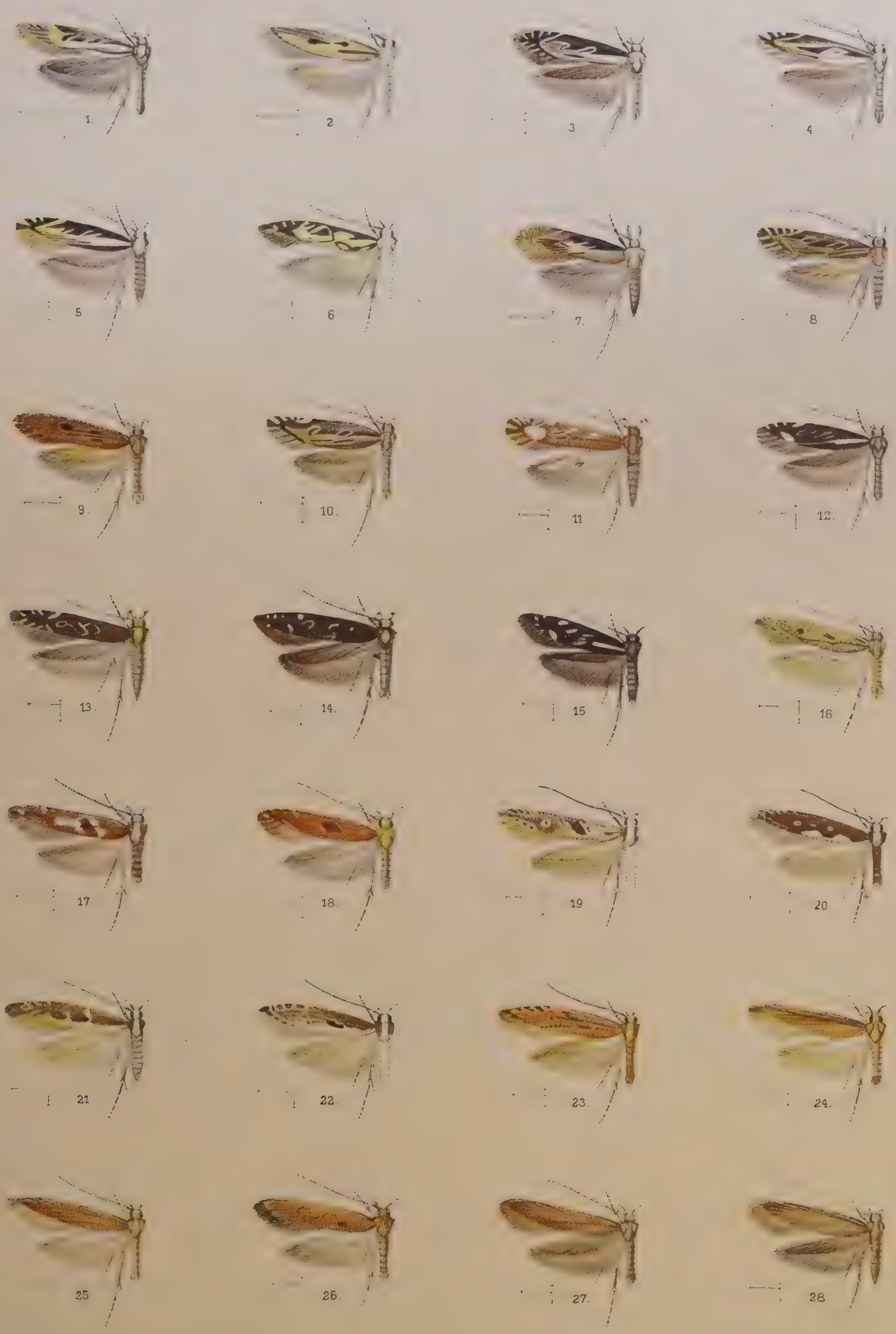
DESCRIPTION OF PLATE XVII. (VOL. I.)

MICROLEPIDOPTERA.

HYPONOMEUTIDAE.

					PAGE
Fig.	1.	*Neelysia lignicolor*	(Type ♂ 26534)	Maui	533
,,	2.	,, *fuscodentata*	(Type ♀ 27500)	Hawaii	534
,,	3.	,, *cleodorella*	(Type ♂ 25251)	Hawaii	535
,,	4.	,, *anthinella*	(Type ♂ 26425)	Lanai	535
,,	5.	,, *repandella*	(Type ♀ 26149)	Molokai	536
,,	6.	,, *psaroderma*	(Type ♂ 25101)	Oahu	536
,,	7.	,, *municeps*	(Type ♀ 26652)	Molokai	537
,,	8.	,, *paltodorella*	(Type ♀ 26910)	Kauai	537
,,	9.	,, *fuscofusa*	(Type ♂ 27099)	Kauai	538
,,	10.	,, *agnetella*	(Type ♂ 26664)	Maui	538
,,	11.	,, *rotifer*	(Type ♂ 26317)	Molokai	539
,,	12.	,, *basivittata*	(Type ♂ 28285)	Maui	539
,,	13.	,, *pluviella*	(Type ♀ 26236)	Molokai	540
,,	14.	,, *ningorifera*	(Type ♂ 28372)	Maui	540
,,	15.	,, *petalifera*	(Type ♂ 26657)	Maui	541
,,	16.	,, *subaurata*	(Type ♂ 27955)	Kauai	541
,,	17.	,, *exaltata*	(Type ♂ 26564)	Maui	541
,,	18.	,, *poeciloceras*	(Type ♂ 28501)	Maui	542
,,	19.	,, *rediviva*	(Type ♂ 27371)	Kauai	543
,,	20.	,, *ningorella*	(Type ♂ 26636)	Maui	543
,,	21.	,, *nemoricola*	(Type ♀ 26369)	Molokai	544
,,	22.	,, *argyresthiella*	(Type ♂ 25675)	Hawaii	544
,,	23.	,, *mactella*	(Type ♂ 27156)	Kauai	545
,,	24.	,, *tischeriella*	(Type ♂ 27901)	Kauai	545
,,	25.	,, *complanella*	(Type ♂ 26129)	Molokai	546
,,	26.	,, *sciurella*	(Type ♂ 26684)	Maui	546
,,	27.	,, *incongrua*	(Type ♂ 26613)	Maui	546
,,	28.	,, *semifusa*	(Type ♀ 26096)	Molokai	547

FAUNA HAWAIIENSIS. VOL. I. PLATE. XVII.



F.W.Frohawk del. A.J.Wendel lith.
P.W.M.Trap. Chromo Leiden.

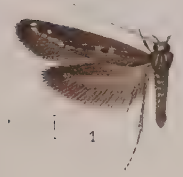
Lord Walsingham. Microlepidoptera.

DESCRIPTION OF PLATE XVIII. (VOL. I.)

MICROLEPIDOPTERA.

HYPONOMEUTIDAE.

					PAGE
Fig.	1.	*Neelysia terminella*	(Type ♂ 26593)	Maui	547
,,	2.	*Dysphoria semicolon*	(Type ♂ 27923)	Kauai	548
,,	3.	*Bubaloceras subeburneum*	(Type ♂ 26107)	Molokai	549
,,	4.	*Hyposmocoma exornata* + *exornata*	(Type ♂ 25554)	Hawaii	550
,,	5.	,, ,, + *flavicosta*	(Type ♂ 28742)	Hawaii	551
,,	6.	,, *oculifera*	(Type ♂ 26982)	Kauai	551
,,	7.	,, *nigralbida*	(Type ♂ 26760)	Kauai	551
,,	8.	,, *nividorsella*	(Type ♂ 26731)	Kauai	552
,,	9.	,, *corvina*, Btl.	(Type ♂ 122 : 81. 7, Mus. Br.)	*Hawaiia* (*Ins.* ?)	553
,,	10.	,, *discella*	(Type ♀ 27907), case (27623)	Kauai	553
,,	11.	,, *divisa*	(Type ♂ 27015)	Kauai	554
,,	12.	,, *partita*	(Type ♂ 28615)	Hawaii	554
,,	13.	,, *trossulella*	(Type ♂ 26016)	Oahu	554
,,	14.	,, *atrovittella*	(Type ♂ 28054)	Hawaii	555
,,	15.	,, *nebulifera*	(Type ♂ 25861)	Oahu	555
,,	16.	,, *torquata*	(Type ♂ 27185)	Kauai	556
,,	17.	,, *notabilis*	(Type ♂ 26065)	Molokai	556
,,	18.	,, *lebetella*	(Type ♂ 26651)	Maui	557
,,	19.	,, *tenuipalpis*	(Type ♂ 26373)	Molokai	557
,,	20.	,, *commensella*	(Type ♂ 28101)	Hawaii	558
,,	21.	,, *leporella*	(Type ♂ 26992)	Kauai	558
,,	22.	,, *abjecta*, Btl.	(Type ♀ 48 : 77. 43, Mus. Br.)	*Hawaiia* (*Ins.* ?)	559
,,	23.	,, *blackburnii*, Btl.	(Type ♂ 123 : 81. 7, Mus. Br.)	*Hawaiia* (*Ins.* ?)	559
,,	24.	,, *cupreomaculata*	(Type ♀ 26338)	Molokai	561
,,	25.	,, *progressa*	(Type ♀ 28503)	Maui	561
,,	26.	,, *domicolens*, Btl. + *domicolens*, Btl.	(Type ♂ 124: 81. 7, Mus. Br.)	*Hawaiia* (*Ins.* ?)	562
,,	27.	,, ,, + *suffusa*	(Type ♂ 27383)	Hawaii	563
,,	28.	,, *lupella* + *lupella*	(Type ♂ 27872)	Kauai	563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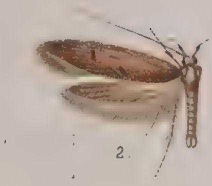
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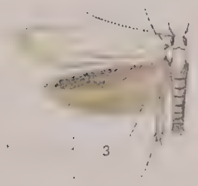
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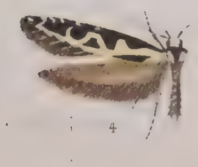
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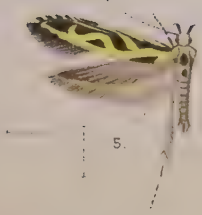
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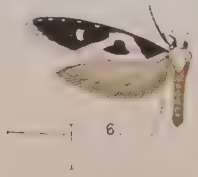
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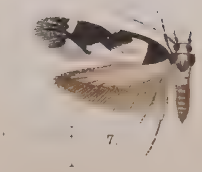
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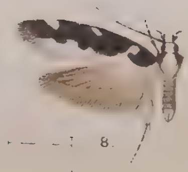
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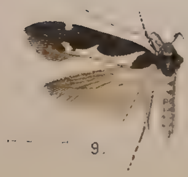
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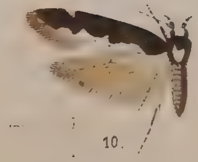
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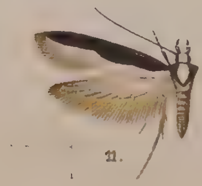
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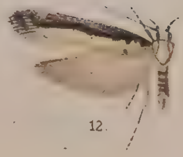
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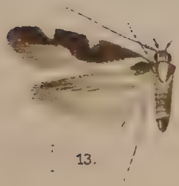
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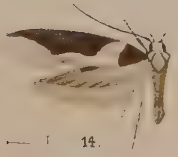
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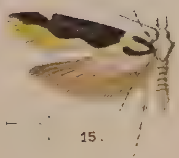
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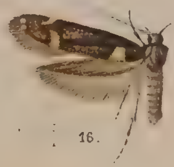
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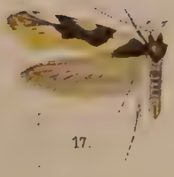
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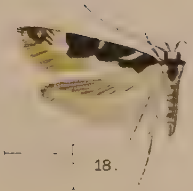
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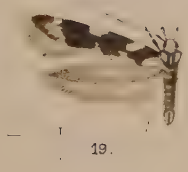
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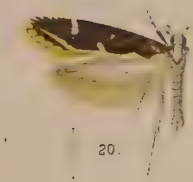
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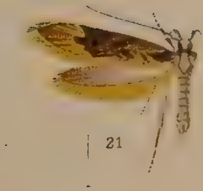
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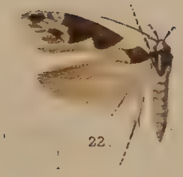
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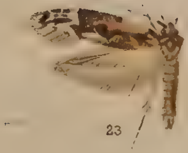
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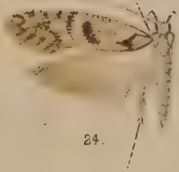
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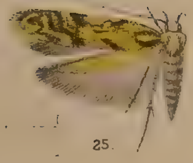
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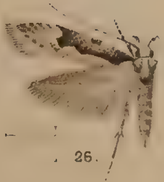
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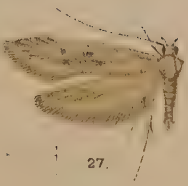
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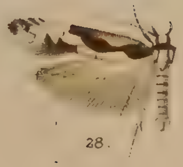
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F.W.Frohawk del. A.J.Wendel lith. P.W.M.Trap Cromolith. Leiden.

Lord Walsingham. Microlepidoptera.

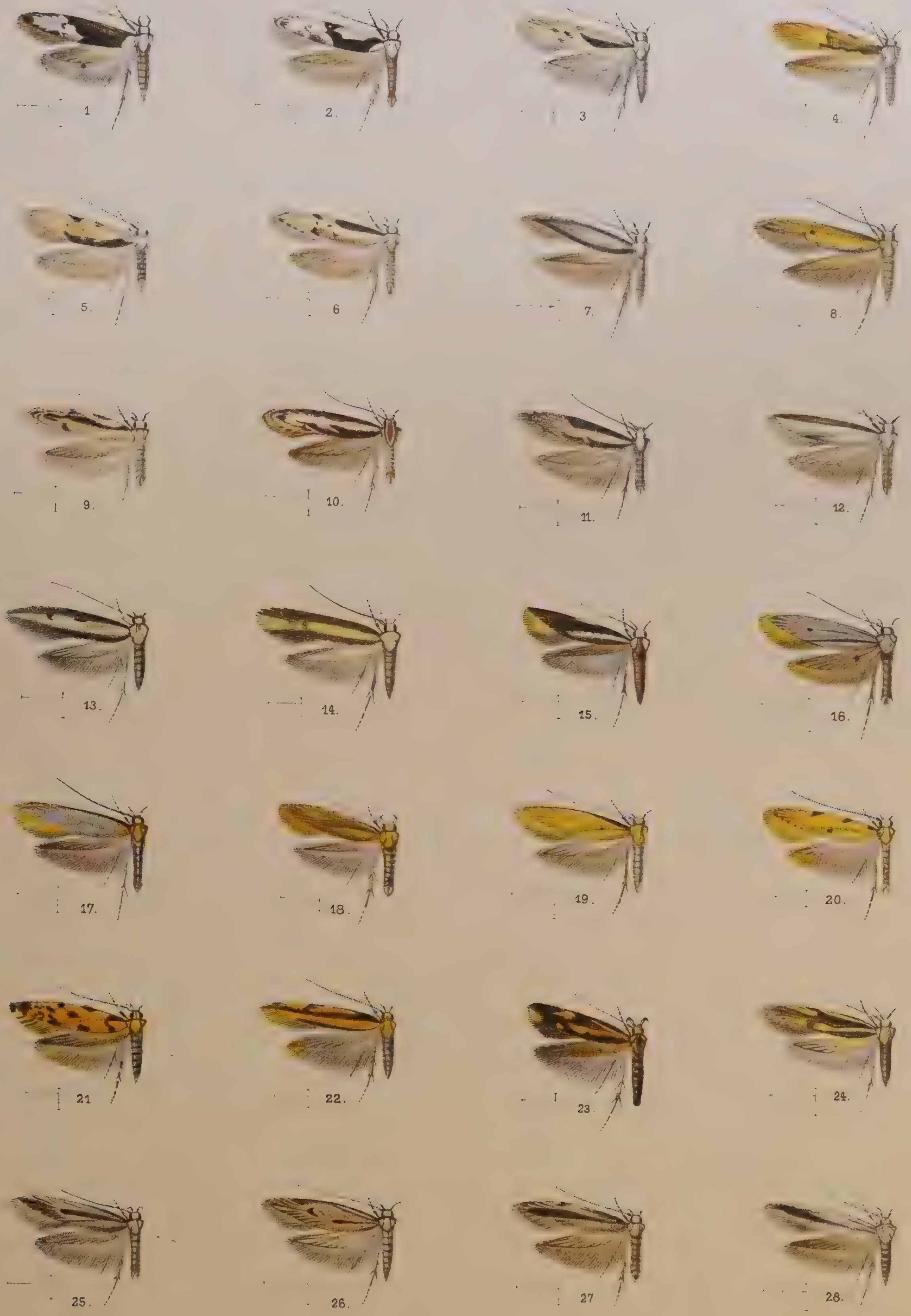
DESCRIPTION OF PLATE XIX. (VOL. I.)

MICROLEPIDOPTERA.

HYPONOMEUTIDAE.

						PAGE
Fig.	1.	*Hyposmocoma*	*lupella* + *suffusella*	(Type ♀ 26137)	Molokai	564
,,	2.	,,	,, + *candidella*	(Type ♂ 25773)	Hawaii	564
,,	3.	,,	*mediella*	(Type ♀ 25067)	Oahu	565
,,	4.	,,	*sabulella*	(Type ♀ 27566)	Maui	565
,,	5.	,,	*albifrontella*	(Type ♂ 26229)	Molokai	565
,,	6.	,,	*humerovittella*	(Type ♂ 25088)	Oahu	566
,,	7.	,,	*cincta* + *cincta*	(Type ♀ 27555)	Kauai	566
,,	8.	,,	,, + *adjacens*	(Type ♀ 27335)	Kauai	567
,,	9.	,,	*mediospurcata*	(Type ♂ 28108)	Hawaii	567
,,	10.	,,	*tripartita*	(Type ♂ 26090)	Molokai	567
,,	11.	,,	*thoracella*	(Type ♂ 26459)	Lanai	568
,,	12.	,,	*limata*	(Type ♂ 27486)	Hawaii	568
,,	13.	,,	*sublimata*	(Type ♀ 28366)	Maui	568
,,	14.	,,	*advena*	(Type ♀ 26091)	Molokai	569
,,	15.	,,	*subflavidella*	(Type ♀ 26595)	Maui	569
,,	16.	,,	*auroargentea*	(Type ♂ 28402)	Maui	570
,,	17.	,,	*illuminata*	(Type ♂ 28384)	Maui	570
,,	18.	,,	*auripennis*, Btl.	(Type ♂ 121 : 81. 7, Mus. Br.)	*Hawaiia* (*Ins.* ?)	571
,,	19.	,,	*rhabdophora*	(Type ♀ 26328)	Molokai	571
,,	20.	,,	*costimaculata*	(Type ♂ 26207)	Molokai	572
,,	21.	,,	*virgata*	(Type ♀ 26094)	Molokai	572
,,	22.	,,	*bilineata*	(Type ♂ 25963)	Oahu	573
,,	23.	,,	*haleakalae*, Btl.	(Type ♀ 126 : 81. 7, Mus. Br.)	*Hawaiia* (*Ins.* ?)	573
,,	24.	,,	*lucifer*	(Type ♀ 26064)	Molokai	574
,,	25.	,,	*evanescens*	(Type ♂ 28378)	Maui	574
,,	26.	,,	*ferricolor*	(Type ♀ 25850)	Hawaii	575
,,	27.	,,	*impunctata*	(Type ♂ 27496)	Hawaii	575
,,	28.	,,	*straminella*	(Type ♀ 25409)	Hawaii	576

FAUNA HAWAIIENSIS. VOL. I. PLATE XIX.



F.W. Frohawk del. A.J. Wendel lith.
P.W.M. Trap. Chromo. Leiden.

Lord Walsingham. Microlepidoptera.

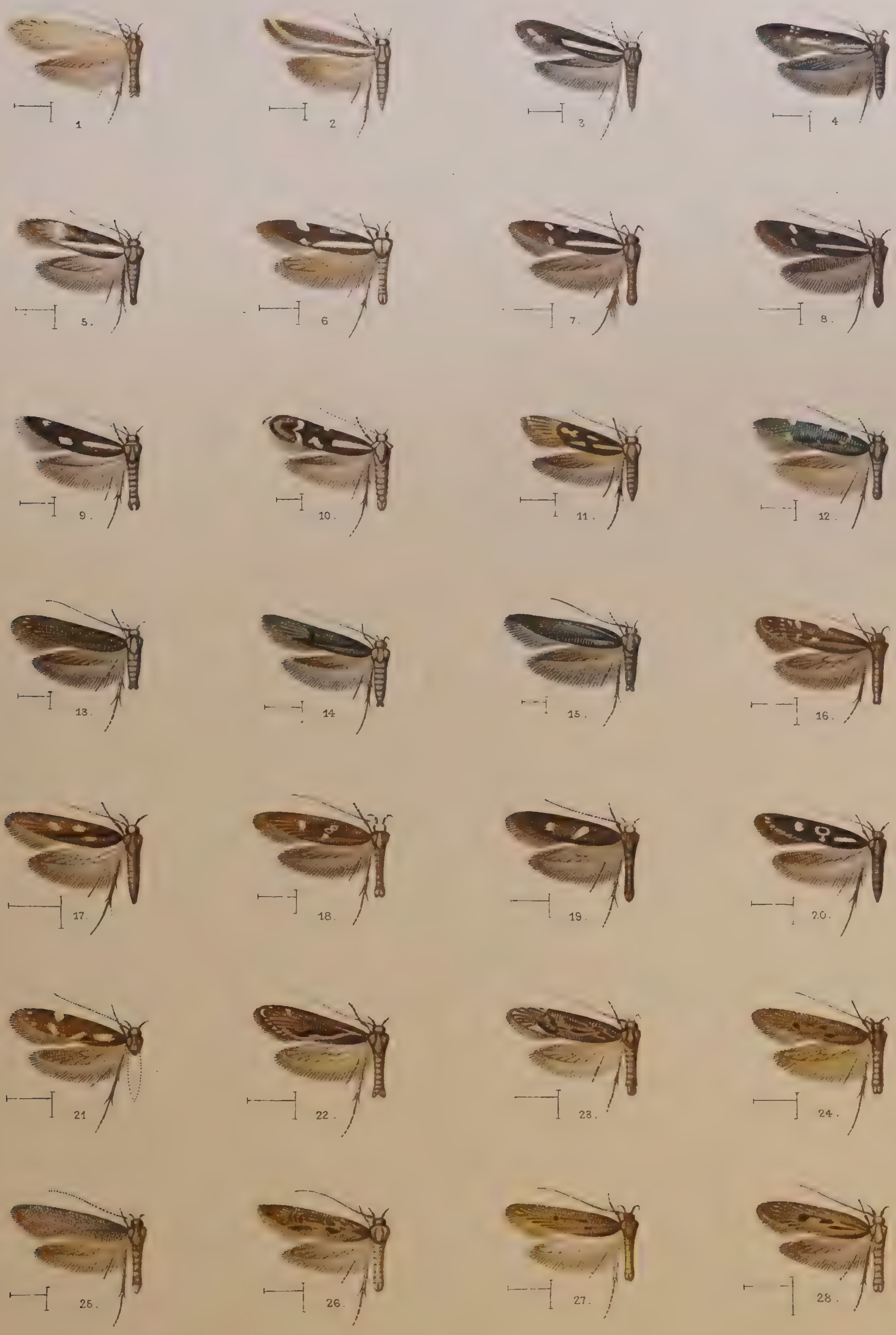
DESCRIPTION OF PLATE XX. (VOL. I.)

MICROLEPIDOPTERA.

HYPONOMEUTIDAE.

						PAGE
Fig.	1.	*Hyposmocoma*	*metallica*	(Type ♂ 25753)	Hawaii	576
,,	2.	,,	*continuella*	(Type ♀ 26623)	Maui	577
,,	3.	,,	*indicella*	(Type ♂ 26639)	Maui	577
,,	4.	,,	*patriciella*	(Type ♂ 28306)	Maui	577
,,	5.	,,	*butalidella*	(Type ♂ 26530)	Maui	578
,,	6.	,,	*unistriata*	(Type ♂ 26382)	Molokai	578
,,	7.	,,	*ludificata*	(Type ♂ 28381)	Maui	579
,,	8.	,,	*lineata*	(Type ♂ 28266)	Maui	579
,,	9.	,,	*propinqua*	(Type ♂ 26152)	Molokai	580
,,	10.	,,	*admirationis*	(Type ♂ 26331)	Molokai	580
,,	11.	,,	*quadristriata*	(Type ♂ 26355)	Molokai	581
,,	12.	,,	*numida*	(Type ♂ 28477)	Maui	581
,,	13.	,,	*nigrescens*	(Type ♂ 27395)	Hawaii	581
,,	14.	,,	*fuscopurpurea*	(Type ♂ 26592)	Maui	582
,,	15.	,,	*nigra*	(Type ♂ 26099)	Molokai...(† *niger*)	582
,,	16.	,,	*lacertella*	(Type ♀ 28526)	Maui	582
,,	17.	,,	*trilunella*	(Type ♀ 28247)	Maui	583
,,	18.	,,	*niveiceps*	(Type ♂ 26470)	Lanai	583
,,	19.	,,	*punctifumella*	(Type ♂ 28577)	Maui	584
,,	20.	,,	*lunifer*	(Type ♀ 28393)	Maui	584
,,	21.	,,	*punctiplicata*	(Type ♀ 26303)	Molokai	584
,,	22.	,,	*marginenotata*	(Type ♂ 26768)	Kauai	585
,,	23.	,,	*vermiculata*	(Type ♂ 28117)	Hawaii	585
,,	24.	,,	*enixa*	(Type ♂ 27932)	Kauai	586
,,	25.	,,	*lugens*	(Type ♂ 26583)	Maui	586
,,	26.	,,	*ocellata*	(Type ♂ 27668)	Kauai	586
,,	27.	,,	*adolescens*	(Type ♂ 27474)	Hawaii	587
,,	28.	,,	*emendata*	(Type ♂ 28289)	Maui	587

FAUNA HAWAIIENSIS. VOL. I. PLATE XX



F.W.Frohawk del. A.J.Wendel lith.
P.W.M.Trap. Chromo Leiden.

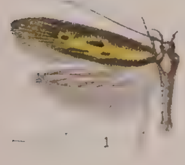
Lord Walsingham. Microlepidoptera.

DESCRIPTION OF PLATE XXI. (VOL. I.)

MICROLEPIDOPTERA.

HYPONOMEUTIDAE.

						PAGE
Fig.	1.	*Hyposmocoma*	*ensifer*	(Type ♂ 27472)	Hawaii	588
,,	2.	,,	*tricincta*	(Type ♀ 25435)	Hawaii	588
,,	3.	,,	*semifuscata*	(Type ♂ 25395)	Hawaii	589
,,	4.	,,	*pucciniella*	(Type ♂ 27408)	Hawaii	589
,,	5.	,,	*scepticella* + *dubia*	(Type ♂ 28496)	Maui	590
,,	6.	,,	,, + *scepticella*	(Type ♂ 26650)	Maui	590
,,	7.	,,	*stigmatella*	(Type ♀ 26353)	Molokai	591
,,	8.	,,	*pallidipalpis*	(Type ♂ 26106)	Molokai	591
,,	9.	,,	*genitalis*	(Type ♂ 28560)	Maui	592
,,	10.	,,	*fractinubella*	(Type ♂ 28559)	Maui	592
,,	11.	,,	*fractivittella*	(Type ♀ 26743)	Kauai	593
,,	12.	,,	*intermixta*	(Type ♀ 26104)	Molokai	593
,,	13.	,,	*geminella*	(Type ♀ 27545)	Kauai	594
,,	14.	,,	*picticornis*	(Type ♂ 26177)	Molokai	594
,,	15.	,,	*phantasmatella*	(Type ♂ 26763)	Kauai	595
,,	16.	,,	*ossea*	(Type ♂ 25787)	Hawaii	595
,,	17.	,,	*argentea*	(Type ♂ 26123)	Molokai	596
,,	18.	,,	*subargentea*	(Type ♂ 26867)	Kauai	596
,,	19.	,,	*lactea*	(Type ♂ 27549)	Kauai	597
,,	20.	,,	*lacticretella*	(Type ♀ 26693)	Maui	597
,,	21.	,,	*persimilis*	(Type ♂ 25404)	Hawaii	598
,,	22.	,,	*trimaculata*	(Type ♂ 25104)	Oahu	598
,,	23.	,,	*albonivea*	(Type ♀ 26014)	Oahu	599
,,	24.	,,	*carbonenotata*	(Type ♂ 27144)	Kauai	599
,,	25.	,,	*alliterata*	(Type ♂ 26151)	Molokai	600
,,	26.	,,	*nigrodentata*	(Type ♂ 26970)	Kauai	600
,,	27.	,,	*obliterata*	(Type ♂ 26965)	Kauai	601
,,	28.	,,	*bacillella*	(Type ♂ 27971)	Kauai	601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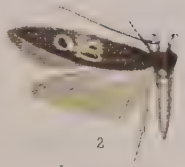
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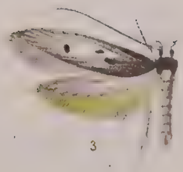
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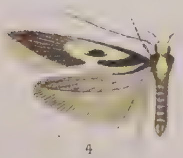
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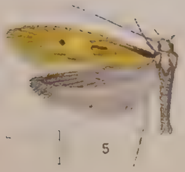
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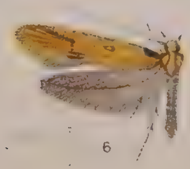
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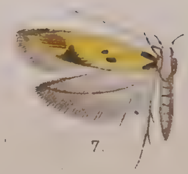
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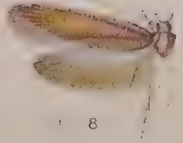
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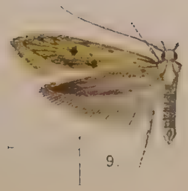
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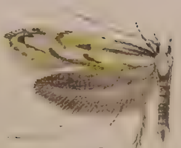
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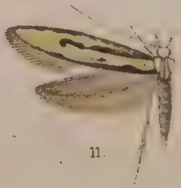
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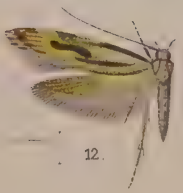
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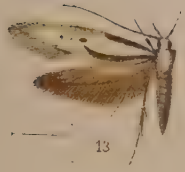
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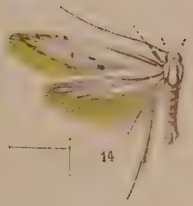
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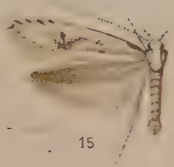
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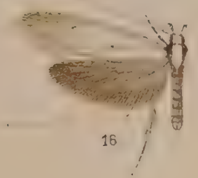
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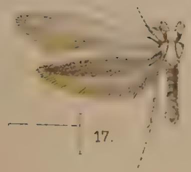
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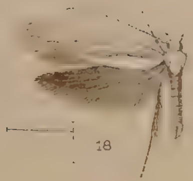
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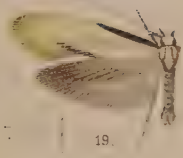
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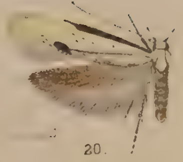
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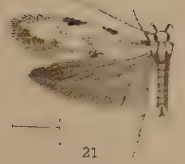
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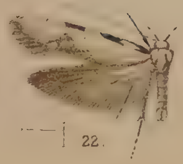
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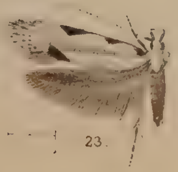
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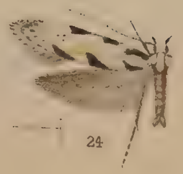
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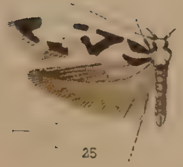
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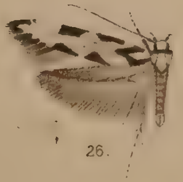
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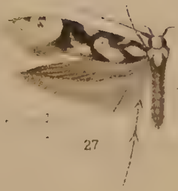
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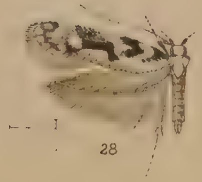
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P.W.M. Trap. Chromo Leiden.

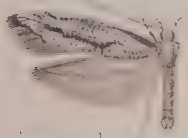
Lord Walsingham. Microlepidoptera.

DESCRIPTION OF PLATE XXII. (VOL. I.)

MICROLEPIDOPTERA.

HYPONOMEUTIDAE.

						PAGE
Fig.	1.	*Hyposmocoma*	*canella*	(Type ♂ 26313)	Molokai	602
,,	2.	,,	*schismatica*	(Type ♂ 27600)	Kauai	603
,,	3.	,,	*cinereosparsa*	(Type ♂ 27104)	Kauai	603
,,	4.	,,	*saccophora*	(Type ♀ 25062)	Oahu	604
,,	5.	,,	*modesta*	(Type ♂ 27022)	Kauai	604
,,	6.	,,	*tomentosa*	(Type ♀ 25379)	Hawaii	605
,,	7.	,,	*dorsella*	(Type ♂ 25109)	Oahu	605
,,	8.	,,	*fallacella*	(Type ♂ 27065)	Kauai	605
,,	9.	,,	*falsimella*	(Type ♂ 26648)	Maui	606
,,	10.	,,	*ochreovittella*	(Type ♂ 25492)	Hawaii	606
,,	11.	,,	*quadripunctata*	(Type ♂ 26937)	Kauai	607
,,	12.	,,	*sudorella*	(Type ♂ 26923)	Kauai	607
,,	13.	,,	*vicina*	(Type ♂ 25052)	Oahu	607
,,	14.	,,	*fulvida*	(Type ♂ 26117)	Molokai	608
,,	15.	,,	*sideritis*	(Type ♀ 28545)	Maui	608
,,	16.	,,	*obscura*	(Type ♀ 26668)	Maui	609
,,	17.	,,	*scandens*	(Type ♂ 27084)	Kauai	609
,,	18.	,,	*maestella*	(Type ♂ 27583)	Kauai	610
,,	19.	,,	*fulvocervina*	(Type ♂ 27829)	Kauai	610
,,	20.	,,	*carnea*	(Type ♂ 26902)	Kauai	610
,,	21.	,,	*roseofulva*	(Type ♂ 27081)	Kauai	611
,,	22.	,,	*subsericea*	(Type ♂ 26360)	Molokai	611
,,	23.	,,	*ochreocervina*	(Type ♂ 25159)	Oahu	612
,,	24.	,,	*syrrhaptes*	(Type ♂ 27125)	Kauai	612
,,	25.	,,	*paradoxa*	(Type ♂ 27303)	Kauai	613
,,	26.	,,	*mimema*	(Type ♂ 28370)	Maui	613
,,	27.	,,	*bella*	(Type ♂ 27982)	Kauai	614
,,	28.	,,	*rusius*	(Type ♂ 26291)	Molokai	614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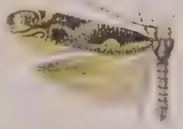
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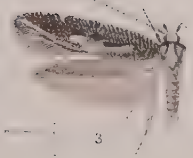
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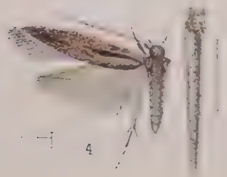
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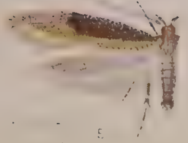
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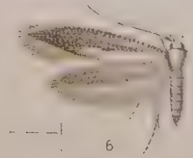
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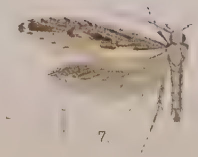
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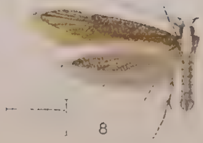
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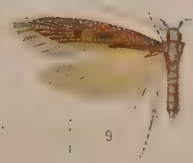
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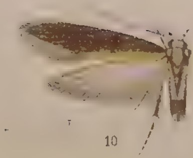
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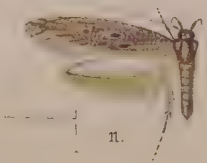
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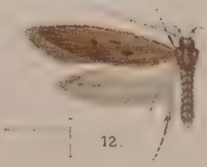
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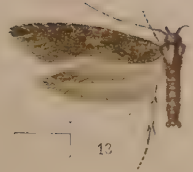
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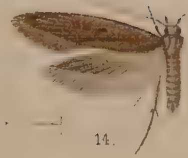
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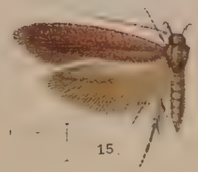
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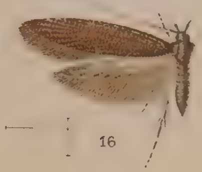
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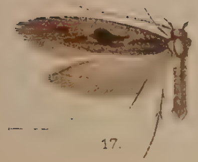
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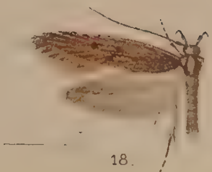
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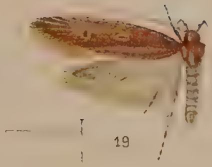
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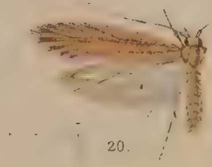
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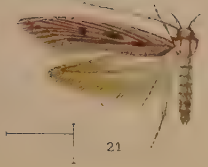
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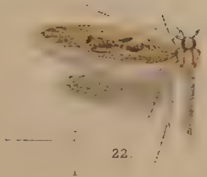
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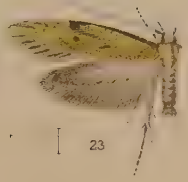
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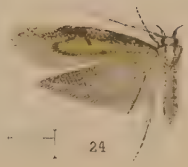
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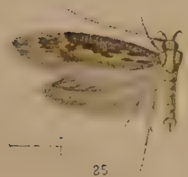
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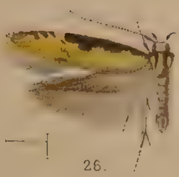
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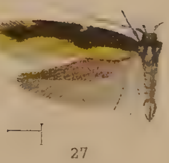
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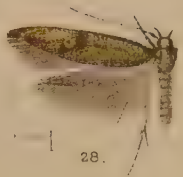
28.

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P.W.M. Trap. Chromo. Leiden.

Lord Walsingham. Microlepidoptera.

DESCRIPTION OF PLATE XXIII. (VOL. I.)

MICROLEPIDOPTERA.

HYPONOMEUTIDAE.

						PAGE
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,,	6.	,,	*similis*	(Type ♂ 25238)	Hawaii	617
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,,	13.	,,	*montivolans*, Btl.	(Type ♂ 162: 82. 9, Mus. Br.)	*Hawaiia* (*Ins.* ?)	620
,,	14.	,,	*iodes*	(Type ♂ 26321)	Molokai	621
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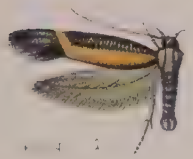
,,	28.	,,	*scolopax*	(Type ♂ 26824)	Kauai	629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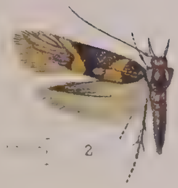
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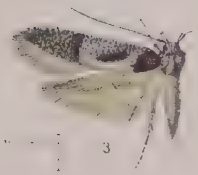
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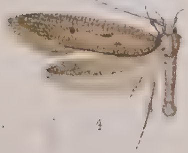
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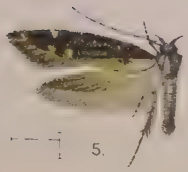
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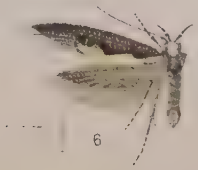
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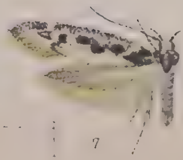
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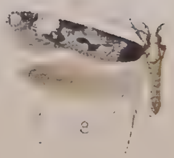
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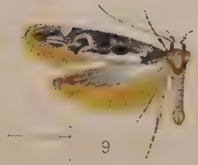
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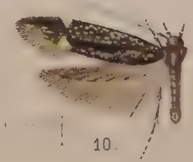
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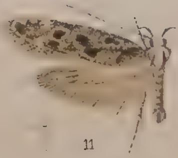
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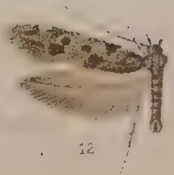
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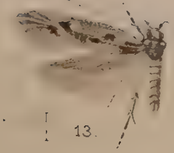
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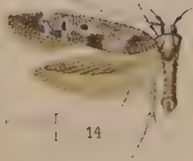
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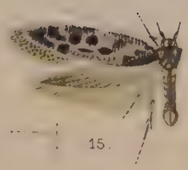
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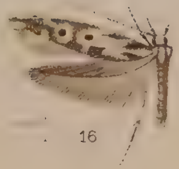
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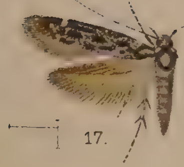
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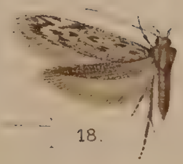
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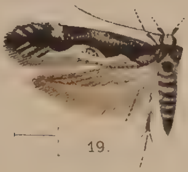
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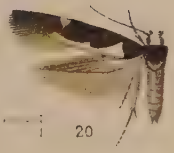
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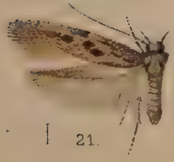
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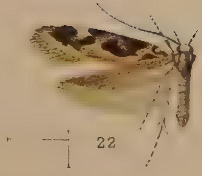
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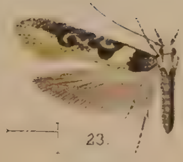
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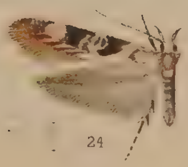
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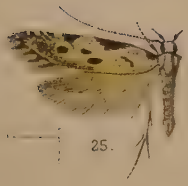
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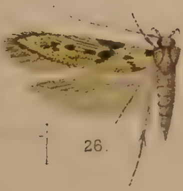
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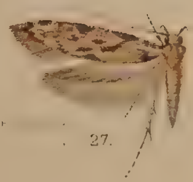
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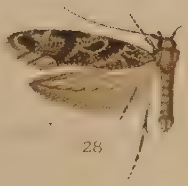
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Lord Walsingham. Microlepidoptera.

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MICROLEPIDOPTERA.

HYPONOMEUTIDAE.

						PAGE
Fig.	1.	*Hyposmocoma*	*subscolopax*	(Type ♂ 27382)	Hawaii	629
,,	2.	,,	*tetraonella*	(Type ♂ 25748)	Hawaii	630
,,	3.	,,	*somatodes*	(Type ♂ 27490)	Hawaii	630
,,	4.	,,	*belophora*	(Type ♂ 25652)	Oahu	631
,,	5.	,,	*turdella*	(Type ♀ 28676)	Lanai	631
,,	6.	,,	*subcitrella*	(Type ♀ 27620)	Kauai	632
,,	7.	,,	*inflexa*	(Type ♂ 28264)	Maui	632
,,	8.	,,	*brevistrigata*	(Type ♂ 26842)	Kauai	633
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,,	10.	,,	*fuscotogata*	(Type ♀ 26062)	Molokai	634
,,	11.	,,	*radiatella*	(Type ♀ 25260)	Hawaii	634
,,	12.	,,	*barbata*	(Type ♀ 26219)	Molokai	635
,,	13.	,,	*fractistriata*	(Type ♀ 25012)	Oahu	635
,,	14.	,,	*longitudinalis*	(Type ♀ 25667)	Hawaii	636
,,	15.	,,	*centralis*	(Type ♂ 28034)	Kauai	636
,,	16.	,,	*chilonella* + *triocellata*	(Type ♂ 26264)	Molokai	637
,,	17.	,,	,, + *chilonella*	(Type ♂ 27198)	Kauai	637
,,	18.	,,	,, + *venosa*	(Type ♂ 26837)	Kauai	638
,,	19.	,,	,, + *percondita*	(Type ♂ 28737)	Hawaii	638
,,	20.	,,	*epicharis*	(Type ♀ 25164)	Molokai	639
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,,	22.	*Hyperdasys*	*semiustus*	(Type ♂ 26860)	Kauai	640
,,	23.	,,	*arundinicolor*	(Type ♂ 27093)	Kauai	641
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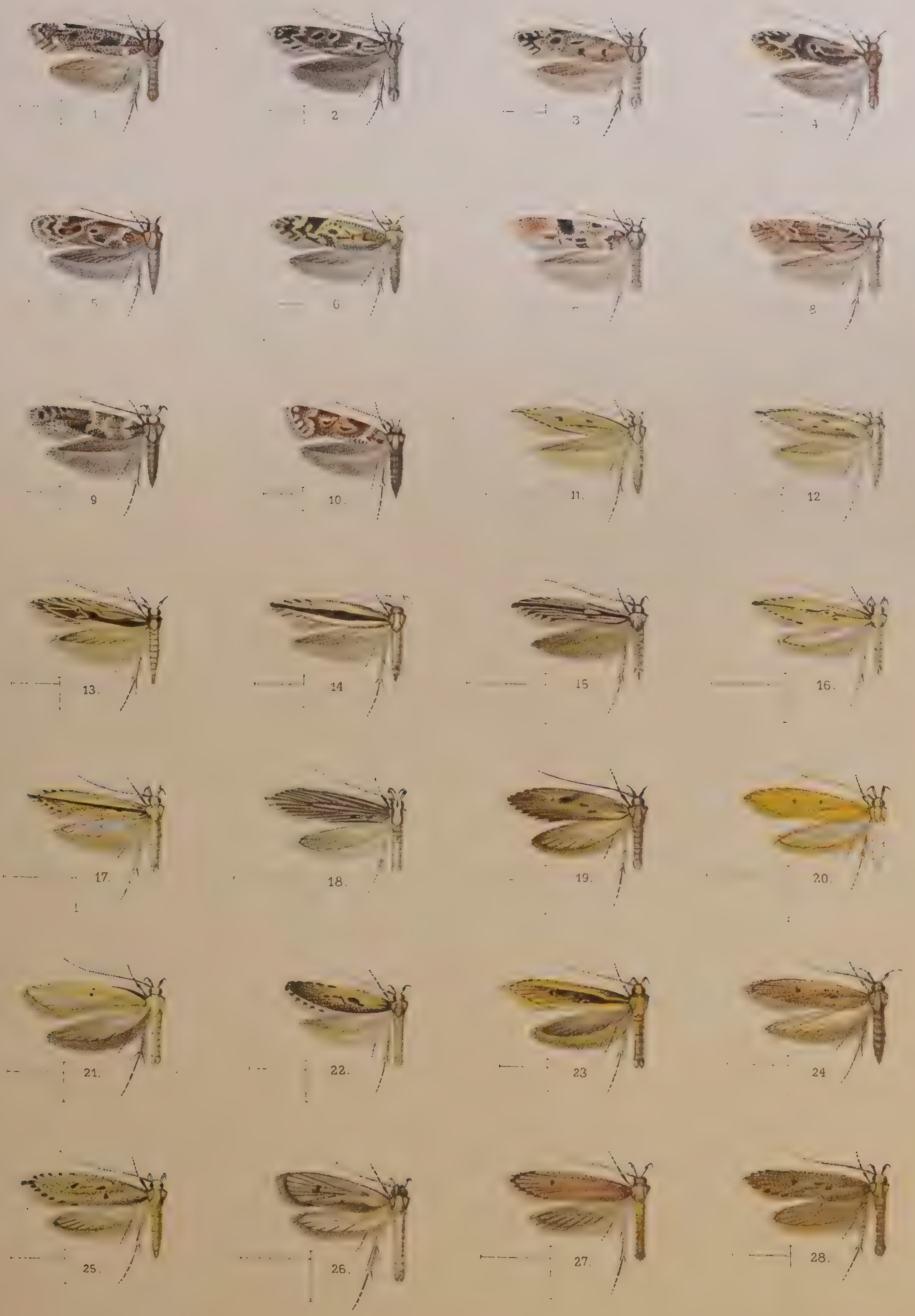
FAUNA HAWAIIENSIS. VOL. I. PLATE XXIV.



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Lord Walsingham. Microlepidoptera.

DESCRIPTION OF PLATE XXV. (VOL. I.)

MICROLEPIDOPTERA.

HYPONOMEUTIDAE, TINEIDAE.

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,,	3.	*Blastobasis inana*, Btl.	(Type ♀ 112 : 81. 7, Mus. Br.)	Oahu	648
,,	4.	*Oecia maculata*, Wlsm.	(Type ♀ 7233)	St. Thomas (West Indies)	649
,,	5.	*Mapsidius auspicata*	(Type ♀ 27659)	Kauai	650
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,,	12.	*Opostega maculata*	(Type ♂ 26184)	Molokai	711
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,,	14.	*Opogona aurisquamosa*, Btl.	(Type ♀ 77 : 43, Mus. Br.)	*Hawaiia* (*Ins.* ?)	713
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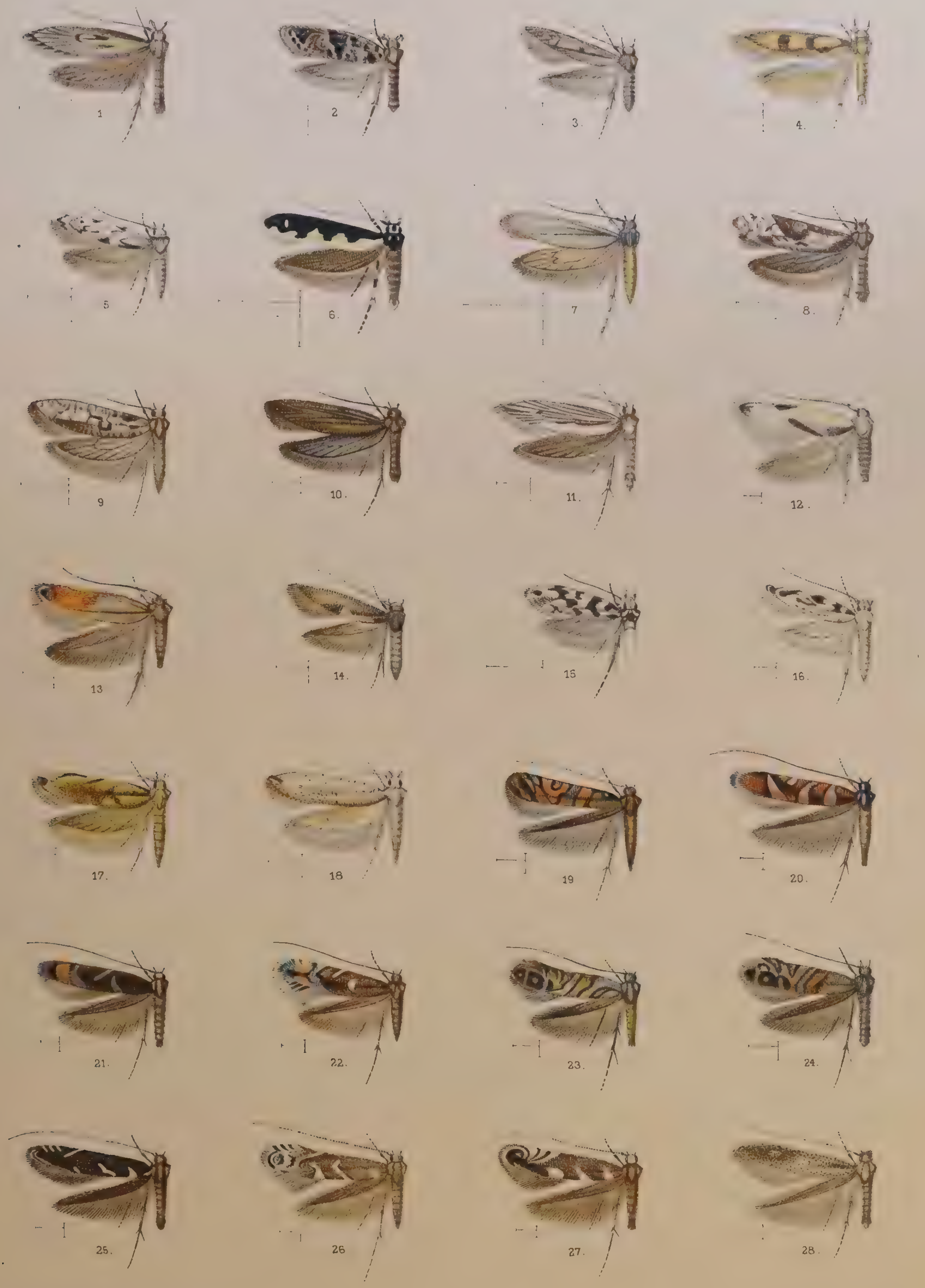

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FAUNA HAWAIIENSIS

VOL. I. PART VI.

PREFACE

INTRODUCTION

By R. C. L. Perkins

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PREFACE

INTRODUCTION

By R. C. L. PERKINS.

FAUNA HAWAIIENSIS

OR THE

ZOOLOGY OF THE SANDWICH (HAWAIIAN) ISLES:

Being Results of the Explorations instituted by the Joint Committee
appointed by

THE ROYAL SOCIETY OF LONDON FOR PROMOTING NATURAL KNOWLEDGE
AND THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

And carried on with the assistance of those Bodies and of the Trustees of

THE BERNICE PAUAHI BISHOP MUSEUM AT HONOLULU.

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DAVID SHARP, M.B., M.A., F.R.S.

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VOLUME I. PART VI.

PREFACE
By the EDITOR.

INTRODUCTORY ESSAY ON THE FAUNA
By R. C. L. PERKINS.

Pages i—ccxxviii *and* 16 *Plates.*

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PREFACE

THE importance of the fauna of the Hawaiian islands has long been recognised, but as no adequate exploration of their zoology had been attempted, the British Association for the advancement of science appointed a Committee in the year 1890 "to report on the present state of our knowledge of the Sandwich Islands, and to take steps to investigate ascertained deficiencies in the fauna, with power to co-operate with the Committee appointed for the purpose by the Royal Society, and to avail themselves of such assistance as may be offered by the Hawaiian Government or the Trustees of the Museum at Honolulu." The Committee of the Royal Society just alluded to was appointed almost simultaneously, and the two Committees have continued to work together till the present time.

The joint Committee has received the most valuable support and assistance from the Trustees of the Bernice P. Bishop Museum at Honolulu. Indeed one of the most important duties in writing this Preface is to make this acknowledgment, and to return thanks for this support.

At an early meeting of the Committee it was decided to limit its investigation to the Land-fauna. Two reasons influenced this decision, viz. (1) that this was as much as the Committee could hope to accomplish, and (2) that while the Land-fauna was known to be undergoing great impoverishment, it was believed that the Marine-fauna was comparatively exempt from analogous changes.

The Committee decided to undertake an exploration of the Islands, and was so fortunate as to secure for the purpose the services of Mr R. C. L. Perkins, then a young graduate of the University of Oxford. Dr Perkins continued his exploration for some years. As he has given an account thereof in the Introduction that follows this prefatory notice it is unnecessary to give particulars here, beyond saying that he underwent great dangers and fatigues, in his arduous and solitary task, with the most determined perseverance, the most unflinching courage; camping out in the mountains, without a companion, for periods as long as he was able to carry food and equipment.

As the result of his work the Committee found itself in possession of an enormous number of specimens, and in pursuance of its work decided on investigating this material and reporting thereon.

It is not possible to state exactly the number of specimens that have resulted from Dr Perkins' labours, but it cannot be far short of 100,000, and not improbably exceeds that number. The Insects of the Archipelago were previous to this investigation supposed to be scanty in the number of species, and it was believed that individuals of each species were as a rule also very few. Both these conclusions have now been shown to be incorrect. Dr Perkins estimates the number of known species of this Class of animals to be upwards of 3,300; and he considers this number to be probably not much more than one half of the total Hawaiian Insect-fauna.

The other Classes of Arthropoda are represented by a considerable number of species. Mollusca is specially rich, nearly 500 species or forms having been recorded. Aves has about 50 peculiar species. The other Classes of animals have been by no means satisfactorily investigated, so that no general zoological Census of the islands can yet be given. But it may be said that at the present time if an exhaustive list of the land and marine fauna could be compiled it might amount to 10,000 species, the great majority of them being peculiar to these precincts. And even this number is liable to be greatly increased if the classes of microscopic animals were included; the Protozoa being, so far as is known to the writer, still untouched. These points are mentioned because it would be a matter for profound regret were it supposed that the work of this Committee—long as it may have lasted—has completed our knowledge of Hawaiian zoology. The Islands having now passed into the control of a State superabundant in wealth and power we may hope that some real effort may be made, by means of local Associations or expeditions from the United States, to supplement our imperfect knowledge. At present there is so far as we know, only one Natural History Association in the Archipelago—the Hawaiian Entomological Society, established in 1905.

Though the task of the Committee may be considered as still incomplete, various reasons render its dissolution advisable. The Committee has lost during its existence two Chairmen, and Dr Perkins who has done most of its work is not able to continue to make for it the great exertions he did make for so many years.

He has however drawn up for us a review of the subject of Hawaiian Zoology. This, in the form of an introduction, will follow this prefatory note. The fauna of the Archipelago has undergone great changes owing to human interference with the natural conditions. It has always been a difficult task to estimate what part of the Fauna is due to recent natural immigration, what to human introduction. The intimate acquaintance of Dr Perkins with the fauna for so many years gives a special value to his review, which, we have no doubt, will be of great assistance to future investigators.

It will be seen from his Introduction that he considers the whole of the fauna is due to ancient and recent immigration, and is now augmented by human introductions. And the peculiarities of the fauna apparently fully justify this conclusion. On this subject we may refer to Wallace's chapter on dispersal and migration (Geographical distribution of animals, Chap. ii) which correctly foreshadows the way in which this fauna has been formed. The peculiar conditions of life in Hawaiia are to some extent illustrated by the maps and landscapes that accompany Dr Perkins' Essay.

The Committees when first constituted consisted of Dr W. T. Blanford, Colonel Godwin-Austen, Mr O. Salvin, Dr P. L. Sclater, Mr E. A. Smith, with Sir W. H. Flower and Professor Alfred Newton as Chairmen, Dr S. J. Hickson as Treasurer and D. Sharp as Secretary. Subsequently Dr F. D. Godman and C. V. Riley joined it. Sir W. H. Flower and Professor Newton, the early Chairmen having deceased, their duties were taken up by the present Chairman Dr F. D. Godman. Professor Hickson the Treasurer, and D. Sharp the Secretary, have filled these offices throughout the 22 years of the existence of the Committee.

The Honourable C. R. Bishop, the founder of the Bernice P. Bishop Museum, has afforded by the instrumentality of the Trustees of that institution the most valuable assistance to the Committee; and as an acknowledgment thereof the Fauna Hawaiiensis has been dedicated to him.

It appears from the Accounts of the Treasurer that the Committee has derived its funds from seven sources, viz.:—(1) the Trustees of the Bernice P. Bishop Museum; (2) the Council of the Royal Society; (3) the Government Grant Committee of the Royal Society; (4) the British Association for the advancement of science; (5) the British Museum (Natural History); (6) Sale of the Fauna Hawaiiensis; (7) Bank Interest. The Treasurer reports that the total from these various sources amounts at present to £4717. 6*s*. 3*d*.

The first set of the specimens resulting from the work of the Committee has been placed in the British Museum (Natural History), which Institution possesses the types of all the new species described in Fauna Hawaiiensis (except possibly a very few described though the property of others). The second set of specimens has, as a rule, been given to the Naturalists who worked out the collections, and whose names will be found in the Table of Contents in Vol. I of the Fauna Hawaiiensis. The third set has been sent to the Bernice P. Bishop Museum, Honolulu. A considerable number of specimens has been given to Dr Perkins for his assistance in Honolulu, where he has been for some years a resident. In addition to these extensive parts of the collections, others have been given to the great Museums at Edinburgh, Dublin, Manchester, Cambridge, Christiania, Stockholm, Copenhagen, Paris, Berlin, Dresden, the Netherlands, Florence, Turin, and Boston U.S. The few specimens still remaining are promised to the Museum of Harvard University.

D. SHARP
(Hon. Secretary of the Committee and
Editor of the Fauna Hawaiiensis).

ERRATA

The following corrections should be made in the text:

Vol. I, p. 31, line 3, for 'first' read second.
Vol. II, p. 13, line 16, for 'interno' read externo.
,, p. 607, at bottom of page *delete N. conifer*, which is an *Odynerus*.
,, Pl. V, figs. 7 and 7 *a*, in description of Plate, for '*A. koelense*' read *A. amaurodytum*.
Vol. III, p. 591, second line from bottom, for 'Anobiids' read *Xyletobius*.
,, p. 616, line 7, twice, and lines 11, 12, 16 and 18, for 'I' read II.
Introduction, p. lxiii, 6 lines from bottom, for 'isolation' read specific endemicity.

INTRODUCTION

BEING A REVIEW OF THE LAND-FAUNA OF HAWAIIA

By R. C. L. PERKINS

Arrangement.—Prefatory, p. xv; general features of the islands, p. xvi; general aspect of the fauna and flora, p. xxiv; time devoted to collecting, and methods, p. xxxii; some previous misconceptions, p. xxxviii; number of species of insects and causes of their extinction, p. xli; introduced, immigrant, endemic, p. xlii; distribution by natural agencies, p. xlvi; flightlessness, p. xlviii; origin of the fauna, p. lii; species formation, p. lxi; summary of the general part of the introduction, p. lxx. Special review of some of the divisions of the fauna[1], viz.: Hymenoptera, p. lxxiii, Coleoptera, p. cxii, Lepidoptera, p. cxliv, Neuroptera, p. clxx, Embiidae, p. clxxiv, Termitidae, p. clxxiv, Psocidae, p. clxxv, Odonata, p. clxxv, Diptera, p. clxxx, Hemiptera, p. clxxxix, Orthoptera, p. ccxi, Thysanura and Collembola, p. ccxx, Myriapoda, p. ccxxi, Arachnida, p. ccxxi, Mollusca, p. ccxxiii, Vermes, p. ccxxviii.

This portion of the 'Fauna Hawaiiensis' may be termed an Introduction to the study of the land-fauna of the Hawaiian islands, and its chief use may be as a guide to further and more special research. It is rather in the form of a series of disconnected essays than a continuous account, this being due to the fact that it has been mostly written at wide intervals of time and in small portions, when the pressure of other work, which could not be neglected, was relaxed. Some repetition will consequently be found, and it has been necessary finally to cut short some questions, which it was intended should be fully discussed, and also to pass by many altogether. The rather full résumé of the Fauna that is given will enable any one to find further illustrations of many of the points that are discussed and furnish hints for further investigation. During the twenty years that I have been working on this Fauna I have received much help in various ways from many people, all of whom I cannot mention individually. To Dr D. Sharp and the late Prof. Alfred Newton I have been particularly indebted for advice and encouragement and to the former also for much help in working out various groups, which otherwise I certainly could not have attempted. Of those, who have their home in the islands, I owe much to the kindness of Messrs Francis Gay and Aubrey Robinson on Kauai, to Mrs Greenwell and her sons on Hawaii, and also to the late Mr R. Meyer of Molokai and the late Mr Valdemar Knudsen of Kauai, both of whom took much interest in scientific work. To numerous others, many alas! now dead, I am also indebted. Mr G. C. Munro, himself an ornithologist, gave me much assistance on many occasions and once or twice spent a day collecting with me. My friend Mr Albert Koebele, the only entomologist in the islands, during most of the period of my active collecting, accompanied me on several collecting trips and gave me many valuable specimens. Unfortunately for the most part he was absent on economic work in other countries. To the Hon. C. R. Bishop, the founder of the Bernice P. Bishop Museum in Honolulu, to the Trustees of the same, and to Dr W. T. Brigham, the Director, under whose guidance it has become a model institution, I am also indebted for help in various ways. Of recent years my colleagues in economic entomology have furnished me with specimens and information, and I have particularly made use of the observations of Mr O. H. Swezey, who has so successfully studied the life-histories of many of the larger and smaller Lepidoptera. The untimely death of my two assistants Messrs G. W. Kirkaldy and F. W. Terry, who were particularly interested in the Hemiptera and Diptera of the islands is much to be deplored. To Mr W. M. Giffard I am indebted for the gift of numerous specimens and the chance to examine many others, by which I have been enabled to gain additional knowledge on the variability of many species. From Bro. Matthias Newell I have received much help on many occasions, including the gift of valuable specimens. Mr Scott B. Wilson, who himself studied the Hawaiian Avifauna on various occasions, gave me much useful information, when I first left England for Honolulu, and other assistance.

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[1] For a similar review of Aves refer to Vol. 1, pp. 368–465.

General features of the islands.

The material collected by myself and others and described or enumerated in this work has been gathered almost entirely from the six largest and most lofty of the eight chief islands of the Hawaiian archipelago. The other two islands Niihau and Kahoolawe, each with an altitude considerably exceeding 1000 ft. above sea-level, have long since been denuded of their forest, having served as pastures for sheep and cattle. If any native fauna now exists on these, it must consist of very few species, and is not likely to be of any great importance. **Kahoolawe**, as seen from the island of Lanai, is often for days together, owing to the destruction of its vegetation, enveloped in clouds of red dust and may now be said to be blowing out to sea. It is no longer of any value even as a pasturage. **Niihau**, the most north-westerly of the main group, still supports large numbers of sheep. From Niihau to Hawaii, in a direction north-west to south-east, the main islands extend over a little more than five degrees of longitude.

North-west of Niihau is a chain of small islands, reefs, and shoals, continuing the archipelago west through 18 more degrees of longitude, the whole Hawaiian group covering some 1800 miles. These small islands have been to some considerable extent explored in search of birds, but very little is known of their other inhabitants.

Laysan, a low island, is remarkable for its Drepanid birds and various Noctuid moths, both clearly allied to species inhabiting the main islands of the group, while Midway also has produced a few insects allied to those on the larger islands. Both these islands, however, have yielded species with no allies on the main group, e.g. Laysan the small bird *Tatare familiaris* and Midway a species of true *Chrysopa* in Neuroptera and a Noctuid moth of the genus *Prodenia*. Laysan has for a number of years been worked for its guano deposits, and, more recently, a cable station has been made on Midway, so it is probable that both these islands are now, or soon will be, overrun with imported insects.

Niihoa or Bird island rising to an elevation of about 900 ft. is the most lofty of the smaller islands, and was visited by an excursion party some 25 years ago. Its geology was studied by Dr S. E. Bishop, but its zoology was neglected. No doubt it contained some much more interesting animals than the countless sea-birds that were noticed. The vegetation being dry was carelessly set on fire, and probably the most interesting part of the fauna was destroyed. It is known that there then existed a thick-billed Passerine bird, probably allied to *Telespiza* of Laysan.

Oahu, Plate V. Of the forest-bearing islands the one whose fauna has been most studied is Oahu. Here more than half a century ago Deppe and Townsend made an extensive collection of the native birds, at a time when these were evidently abundant, more numerous, as they state, than on the more northern island of Kauai. In more recent times the relative abundance of birds on these two islands has entirely changed, no doubt owing to the chief port and settlement of the group having become established at Honolulu on Oahu, and the greater and earlier interference with its natural conditions, that were brought about thereby. Blackburn's well-known researches on the insect fauna were mainly carried out on Oahu during the six years of his residence at Honolulu. Similarly the great variety of its land molluscs and the beauty of many of these have induced many residents in Honolulu to become collectors, either temporarily or continuously.

The area of Oahu is 598 square miles and for its size there is reason to suppose that it is or has been one of the richest of the group in its fauna. It is rather more than 70 miles from Kauai, at their nearest points, and 25 from Molokai. Like Maui and Molokai it is formed of a fusion of two islands. Of quadrangular shape the west side is occupied by the Waianae range, of much greater age than the longer Eastern or Koolau range, and, doubtless, existing as a distinct island long before the latter emerged from beneath the sea. The highest peak of the Waianae range is Kaala (4030 ft.). There are several large and deep valleys each containing a stream of water on its western side, and on the eastern side it is also much eroded into deep gulches and valleys. On this side its lower slopes are overlaid by the later lavas from the younger Koolau range, so that between the two ranges is an elevated plateau rising to nearly 1000 ft. above the sea. This plateau was once densely forested, but is now practically denuded, having served as pasturage for cattle, while more recently it has been partly put under cultivation for the production of pine-apples. The extent of forest on the Waianae range is now small, the introduced goats and cattle having been largely responsible for its destruction.

The Koolau range is much more heavily forested, though it has been greatly denuded during the last half century. The backbone of these mountains is much serrated, and the highest point Konahuanui, rather more than 3000 ft., lies a few miles behind the town of Honolulu, while there are several other peaks between 2500 ft. and 3000 ft. On the windward side for a long extent the erosion has been very great, forming perpendicular or very steep cliffs; on the leeward side the slopes are much more gradual, but are channeled by many valleys and gulches, which, in the more southern part especially, are often separated from one another by very narrow and sharp ridges at least towards their heads.

More recent than the Koolau range proper are some other craters, e.g. the Tantalus series, lying close behind Honolulu, and forming a favourite collecting ground, owing to their nearness to the city and easiness of access, while younger still are various isolated craters situated on or near the coast, e.g. Punchbowl, Diamond and Koko heads and others. Diamond head near Honolulu is interesting from the fact that it contains in a subfossil state great numbers of the shells of land molluscs, including several species of the Achatinellid genus *Amastra* and *Leptachatina* as well as *Succinea*, *Pupa*, *Eudodonta* and others. *Achatinella* itself does not appear to be found with these. A species of *Succinea* is still living there, but molluscs such as *Leptachatina*, *Eudodonta* and *Amastra* could no longer exist under the present dry and barren conditions. Formerly vegetation and moisture must have been very different to support these creatures.

Oahu, though the area of its forests is much diminished, is certainly rich in the number of species of the plants that compose this. The most extensive forest is found in the north-western area of the Koolau range. Parts of this area, however, appeared to me to afford much less variety in their botanical productions than the southern and more northern ends of the range. I have reason to suppose that the part of the range nearest to Honolulu (and containing, as has been said, the highest peak) has the richest fauna.

Kauai, Plate V, the most northern of the forest-clad islands, is separated from Oahu by a channel of rather more than 70 miles, where narrowest, a much greater distance than divides any other island from its nearest neighbour. It is of slightly less area than Oahu, and its outline is more nearly circular. The culminating peak is near the centre of the island, and is above 5000 ft. high. From this summit, Mt. Waialeale, and the adjoining plateau, valleys and gulches radiate to the coast.

As usual, erosion is very great on the windward as compared with the western side of the mountain. There are a number of constantly flowing streams of considerable size, some almost worthy of the name of river. As on Oahu and in fact on all the islands, the forests have been much denuded, but the central portion of the island is well-wooded. In some parts the vegetation is very varied, but in others at no great distance it is very uniform, and it is quite clear that causes quite apart from age may determine the variety or otherwise of the plants on different islands or on different parts of an island. The elevated plateau of the interior is for a large part of a boggy nature, and forms the main watershed of the island.

Niihau, the small island west of Kauai and now forestless (as has been already mentioned), was not visited by me. Shells of land molluscs of the genus *Carelia* have been found in a subfossil state there, indicating no doubt a once heavy forest and considerable moisture. It does not appear that the destruction of the forest has been recent, or that any considerable vegetation of larger growth existed at the time of Cook's arrival at the islands.

Molokai, Plate VI. East of the south coast of Oahu, and separated from it by a channel of about 25 miles, is the narrow island of Molokai, with an area of 261 square miles. Like Oahu and Maui it is formed of two distinct components, the western mountain or Mauna Loa, with an elevation of nearly 1400 ft., and the larger and more important eastern division with its highest peaks, Olokui 4600 ft. and Kamakou 4958 ft. Mauna Loa has for years been used as a sheep-pasture and is now almost denuded of native trees. No doubt before the advent of the white man it was fairly well forested, and the empty shells of dead Achatinellids of the genus *Amastra* have been found there, sure evidence of a condition of moisture that has passed away with its forest.

The eastern mountains have also been much denuded of their woods on the leeward slopes and for a large part not much dense forest remains except near the backbone of the mountain, where leeward and windward sides meet. On one large area fairly well covered with forest in 1893, but showing some signs of further deterioration in 1896, I reckoned that between the latter year and 1902 two-thirds or more of all the trees had died. This destruction was due to cattle and an introduced Japanese deer. The latter, indeed, became so plentiful that skilled hunters were brought from California to slaughter as many as possible. Both cattle and deer finally entered the wettest and densest parts of the forest, so that in 1902 the appearance of these was totally different from that which they presented six years previously. The Molokai woods have a fairly varied growth of trees and bushes in some localities, but there is an entire absence of Koa forest, and as the Koa (*Acacia koa*) is one of the most productive trees for the entomologist, a deficiency of species of insects is natural on this account. Evidently there was once a considerable growth of the allied *Acacia koaia* or of this and *A. koa* on the lower slopes, below 2000 ft., but these were at the time of my earliest visit mostly dead, and what remained alive were scattered trees, outside the limits of true forest, and quite unproductive.

On the north side of the island there has been much erosion, forming the deep valleys of Waikolu, Pelekunu and Wailau.

Lanai, Plate VII, is the smallest of the forest-bearing islands, and its highest point is 3400 ft. above the sea. The forest occupies only a small area of the whole island, in the neighbourhood of its highest ridge, above the Palawai valley. Cattle, sheep and wild goats have been responsible for this deforestation. It is quite obvious on examination that parts of the higher mountains of Lanai, though now much drier, were once of the boggy nature of the wettest parts of Molokai and other of the islands. A few of the insects peculiar to such boggy uplands still maintain their existence in spite of the drying up of the forest, but, doubtless, many have disappeared. I found a large variety of mostly small-sized trees in the remaining wooded parts of the island, but, as on Molokai, Koa forest is wanting. One feature in 1896 was the comparative abundance of the half-dozen species of native land-birds in this small patch of forest, their number being out of all proportion greater than that of the species on Oahu with its comparatively large forest area. The large Maunalei gulch on the north side contains the one permanent stream of water; in 1894 the forest on its sides had already been destroyed by wild goats, so that it was difficult and dangerous to descend into the upper parts of the valley from above, since, in climbing down, the bare rocks and earth were easily dislodged both by the climber and by the numerous flocks of startled goats.

Maui, Plate VI, a large island with an area of 728 square miles, lies east of Lanai and Molokai and is separated from these islands, at the nearest points, by channels of only about 8 to 10 miles in width. When standing in the mountains of Molokai above Kamalo and looking at West Maui it is quite easy, under favourable conditions of light, to distinguish several of the trees, which are chief components of the forest of the latter, the different colours of their foliage being obvious to the naked eye.

Maui consists of two geologically distinct islands united into one, the connection being a sandy isthmus. The west division is much older than the larger eastern mountain, but the connection between them does not rise to any considerable height above the sea (about 150 ft.) as compared with the intermediate plateau of the Oahuan ranges. Probably it has never borne more than a scrubby vegetation, and this fact is of importance in considering the means of distribution of species from Haleakala to West Maui and vice versa.

The highest altitude of West Maui is nearly 5800 ft., Eke with its boggy summit being about 1200 ft. lower. These high altitudes are usually wrapped in mists and rain; the ground, mosses and other vegetation are always saturated with moisture, so that, unless under exceptional circumstances, collecting in a general way is almost impossible. The streams issuing from these watersheds have eroded great numbers of gulches and larger valleys, the Iao, Waihee, Olowalu and others being conspicuous. The vegetation of the west and east side of West Maui is very different.

East Maui is formed of the great mountain Haleakala, the highest point being rather more than 10,000 ft. above the sea, and on the edge of the summit caldera. Owing to its altitude, East Maui differs essentially from any of the islands already mentioned in the fact that here for the first time we are dealing with a mountain, in which there is an extensive area above the limits of forest growth, while the summit is nearly devoid of vegetation. The bottom of the great caldera is about 7000 ft. above the sea and its sides are in some parts precipices of 2000—3000 ft. high. It contains numerous cinder craters, which are themselves five to nine hundred feet in height. The northern slope of the mountain is seamed with gulches, the forest-belt on that side intercepting the heavy rain-fall, while the western slope is dry and comparatively little eroded. This northern forest-belt differs much in the variety of its plants in different parts of its extension from west to east. In some parts during recent years many trees have died from a disease of obscure origin, so that fears have arisen as to the permanency of the watersheds, the water supply being of the greatest value for purposes of irrigation. On the drier western side the trees have been much destroyed by cattle, but on the windward side the growth of forest is extensive and in parts forms a very dense belt. Owing to its elevation, the summit of Haleakala is sometimes capped with snow in the course of the winter months.

Hawaii, Plate VIII, is by far the largest of the islands, its area being 4015 square miles, or much more than that of all the others together. Its northern extremity is 30 miles distant from Maui. It is of subtriangular outline and has been formed from five volcanic centres. Mauna Loa (13,650 ft.) and Kilauea (4040 ft.) are still active volcanoes, occupying with their slopes the south portion of the island, Kilauea lying east of the large mountain; Hualalai (8269 ft.), near the middle of the west side of the island, was last in eruption in 1801. Mauna Kea (13,825 ft.) is the most lofty of Hawaiian mountains, and is regularly snow-capped during the winter months. In the Hilo district its slopes bear a wide and dense forest-belt, though this has been lessened on the lower side by the cultivation of sugar-cane and other causes. North of this, in the Hamakua district, the belt of forest is much thinner, and some years since was considerably ravaged by fire. However, although much has been destroyed by cattle or cultivation, it may be said that all the districts, into which Hawaii is divided, still have extensive forest areas. In the variety of their vegetation these forests differ much according to locality, nor is an older part of the island always everywhere more rich than a younger one. Thus some parts of the older Mauna Kea are comparatively uniform in their vegetation, some parts of Mauna Loa well varied; but it is possible that the richest localities of Kea are richer than those of Loa, and the poorest of Loa poorer than the same of Kea.

In the northern corner of the island lie the Kohala mountains, much the oldest portion of the island, and which no doubt existed as a separate island long prior to the emergence of the other volcanic centres. These mountains rise to an elevation of five and a half thousand feet, and on the windward side are covered from the coast-line to the boggy summit with a dense and very humid forest. On this side are the large, deep valleys of Waipio and Waimanu, due to erosion.

There is no real break between the forests that clothe the different mountains of Hawaii, but all are or have been in some parts continuous, so as to allow of a ready passage for their denizens from one mountain to another. Doubtless, owing to the destruction wrought by man and his imported domestic animals during recent years, there are now large areas treeless or nearly so, where before continuous forest existed and made the connection still wider. Between the Kohala mountains and Mauna Kea are the uplands of Waimea, which have long been used as a pasturage for cattle to the detriment of their native vegetation. Between the three great mountains Loa, Kea and Hualalai is a vast arid tract reaching an elevation of over 6000 ft., of excessive roughness, being traversed by many lava flows from Mauna Loa.

The maps of the islands, which we have been permitted to reproduce by the kindness of Mr Willis T. Pope, Superintendent of Public Instruction in the islands, give a good general idea of the rough and broken character of the ground over which most of the collector's work is done.

A map showing the relative positions of the Islands was issued with Part 1, Vol. I of this work.

As a group the Hawaiian islands are amongst the most isolated portions of land surface. The main islands are placed a little within the tropic of Cancer or in the same latitude as a middle strip of Mexico. They are much nearer to the North American continent than any other, the coast of California being distant about 2100 miles, the portion of Mexico, above mentioned, being considerably more distant still. On the west Hong Kong is in the same latitude. Almost south of the group, the Samoan and Fijian groups, the only islands of considerable size, are 30 to 40 degrees distant. Between these and the Hawaiian group lie a number of small islands, but the nearest of these, Palmyra (5° 49′ 04″ N.), is very remote and separated by an enormous depth of ocean. The extreme outlying islands (Midway, Ocean, etc.) to the N.W. of the archipelago are equally separated from other lands.

The general features of the Fauna are somewhat similar to those of Madeira and the Canary islands and to New Zealand, but in details they are very different from any of these. Tahiti and the Samoan group are not sufficiently well known to make any comparison of much value.

Owing to the mountainous character of the islands there is great diversity of climate in different localities. The prevalence of the trade-winds through a great part of the year causes much heavier precipitation on the windward side of the islands, while on the lee side, though the mountains may have copious rains daily, the coastal region gets little or none of these. The region of heaviest precipitation, whether on windward or leeward side, is generally from 1200 to 5000 ft. above sea level, or corresponds with the region of dense forest.

The temperature at the United States Weather Bureau Station in Honolulu for the years 1905—1909 is recorded as follows:

	1905	1906	1907	1908	1909
Highest shade temp. (Fahr.)	84°	85°	86°	85°	84°
Lowest temp.	57°	57°	62°	61°	56°

On the lowlands a temperature of 90° or even more is occasionally but very rarely noted, and one as low as 52° rarely occurs.

The decrease of temperature with elevation is reckoned as 1° F. for each 320 ft. of ascent in the mountains.

At the U.S. Weather Bureau Station the annual rainfall in Honolulu for the five years above quoted was 16·99, 25·77, 30·13, 19·17 and 20·81 inches, while in some coastal localities the rainfall would be considerably less. A few miles behind the town the rainfall is much heavier; thus on Mount Tantalus, in 1905, at an elevation of 1300 ft. it amounted to 99·68 inches, while on the ridges behind Tantalus it would have been much heavier still—probably twice as heavy—since they precipitate much of the rain before it reaches the Tantalus group. In a wet district, such as windward Hawaii, the rainfall for the same five years at Hakalau in the Hamakua district at an elevation of 200 ft. was 167·59, 122·80, 182·60, 147·19 and 152·54 inches, and a few miles above, at 1200 ft. elevation, it was much heavier still, 260·67 (1907), 206·33 (1908) and 233·75 (1909).

In 1907 (a year selected at random) at Waiakea (50 ft.) in the Hilo district of Hawaii it was rainy on 333 days; at Waianae, a very dry district of Oahu, on 60 days of the same year.

As by far the greater part of the Fauna has its home in the wet-belt or forest-belt it will be easily understood that any particular collecting trip can be, and often is, very seriously interfered with by climatic conditions. On the high mountains of the Kona side of Hawaii, there is (where it has not been destroyed) a very dense forest-belt with heavy rainfall and a much drier but well-forested region above this. Something like this is also found on the windward side, but there is this great difference, that, on the latter, the region below the forest enjoys a large rainfall, while on the Kona side the lower slopes and coastal region are for the greater part of the year extremely dry and parched up.

In the winter the highest mountains of Hawaii and less frequently Haleakala on Maui are snow-capped, the snow sometimes extending down into the forest-belt. Frost is rarely observed below 4000 ft. even in the winter months. In Feb. 1902, in some more or less open forest land on Molokai at 3000 ft. the ground was white with hoar-frost on several consecutive days, and all the tender pink-coloured terminal leaves of *Myrsine* were blackened and killed by the cold. In the denser forest at a higher elevation no such effect was visible, and no signs of frost were seen there on these days. When one is camping in the rain-belt and in search of creatures, for successfully collecting which a fair amount of fine weather is essential, it is very tantalizing to see the lowlands blazing in the sunshine, while the forest-belt day after day is wrapped in fog and rain.

General aspect of the Flora and Fauna.

The fauna of the islands is necessarily so intimately connected with the peculiarities of the flora, while the peculiarities of the latter are in like manner sometimes evidently connected with the remarkable characters of the fauna, that some consideration of the vegetation of the islands is necessary. Every student of the natural history of the islands is much indebted to the late Dr W. F. Hillebrand, whose "Flora of the Hawaiian Islands" has proved a most valuable work. In some introductory remarks, which he did not live to complete, he cites 860 species of Phanerogams and Vascular Cryptogams as natural immigrants or as peculiar to the islands, after deducting those introduced by man since and before the discovery of the islands by foreigners. Of the 860 species 653 are endemic (or 75·9 per cent.) and 250 of the species belong to 40 endemic genera. Of Phanerogamous plants 81·4 per cent. are endemic, of Dicotyledinous 85·6. Since Hillebrand's work, as is natural, additional species have been discovered from time to time and some changes have been made in the number of the genera that are endemic, but until the completion of the study of the flora by botanists of to-day the above figures may be accepted. From my own observations I have reckoned that the endemic plants, given as 653 by Hillebrand, are probably not more than two-thirds of those that exist. This reckoning is made from the considerable number of species, not included in Hillebrand, that I have casually observed, when investigating the fauna, and on the consideration that the systematic botanist would generally speaking adopt Hillebrand's views as to specific characters. It is clear that the additions to the list of endemic plants will be mainly in an increase of species allied to those already known, rather than in the discovery of striking new forms. In other words the general features of the flora are adequately known.

Owing to the mountainous character of the islands, with great differences in rainfall and temperature at different altitudes, the flora varies very greatly at different heights on the mountains.

Littoral plants are very poorly represented, mostly by natural immigrants of wide distribution elsewhere. Many of these have fruits or seeds that float for long periods, and have no doubt reached the islands on ocean currents. A few only are endemic, e.g. the parasitic dodder (*Heliotropium anomalum*) and species of the Composite genus *Lipochaeta*. The littoral insect fauna (excluding foreign forms) is likewise poor, and most of the species that are attached to the coasts also range inland over the plains or ascend the dry and bare lower slopes of the mountains. They are xerophilous rather than strictly littoral, and some of them even reappear in the dry open country above the forest-line and rain-belt, even at elevations above 7000 ft. Some, however, if not absolutely confined to the region of littoral plants, yet never wander far inland. These include a number of endemic bees and wasps, which visit the flowers of such plants as *Vitex trifolia*, *Scaevola koenigii*, *Tribulus*, *Waltheria* etc., the wasps finding their prey amongst these and other sublittoral vegetation, such as species of *Sida*, *Lipochaeta* and foreign weeds. The Otiorhynchine beetle *Rhyncogonus vestitus* is attached to *Vitex*, the endemic moth, *Pyrausta litorea*, to *Scaevola*, while the caterpillars of a few Noctuid moths and some Hemiptera (both Heteropterous and Homopterous) feed on grasses and low flowering plants that grow in the sand. On the whole the littoral fauna appears to be at any rate less poor than its flora.

On the leeward side of the islands, owing to the comparatively small amount of rainfall and (usually) the absence of any heavy rains during the greater part of the year, the vegetation of the coastal region and lower mountain slopes is for the most part dried up, and only after heavy rains does the verdure reappear. At the present time, however, numbers of xerophilous plants, introduced by man, do much to lessen the arid appearance of the lowlands. Chief of these is the algaroba or mesquite (*Prosopis*), the most valuable tree ever imported into the islands. In some of the driest coastal districts it now forms quite a forest-belt, affording food and shelter to cattle and other animals, and an abundance of excellent firewood. An *Opuntia* of very early introduction, a mimosa (*Acacia farnesiana*) and *Lantana camara* are very conspicuous and to the stranger might have the appearance of being really native.

Most of this region and the mountain slopes that lie below the forest, where they are not under irrigation or cultivated, have for years been grazed over by cattle. This region is also overrun by foreign weeds, imported by man, and little is left of the native vegetation. Where there is a covering of grasses, these are generally foreign. However, in the most arid districts of the islands, where foreign weeds have failed to establish themselves to any great extent, or at least do not thrive, and on some of the rough lava flows, avoided by the cattle, a considerable number of native shrubs and trees may still be found. In a few places on these dry mountain slopes there yet remain a few choice endemic plants, now mostly extremely rare, such as the red-flowered cotton tree (*Gossypium drynarioides*) and the shrubby violet (*Viola helioscopia*). Though so greatly denuded, here and there, either singly or in clumps, we meet with various endemic or immigrant species of interest, e.g. *Maba*, *Santalum*, *Nothocestrum*, *Gardenia*, *Nototrichium*, *Dodonaea* and *Erythrina*. *Pandanus odoratissimus* grows scattered or in thickets in many places, and groves of bread-fruit trees occur rarely, as evidence of former cultivation.

A number of plants of aboriginal introduction belong to this region, but all of them more or less frequently extend upwards till they form part of the regular forest. The Hau tree (*Paritium tiliaceum*) thrives equally near the sea-coast and above 1000 ft. elevation in the mountains, where it sometimes forms impenetrable thickets. *Aleuritis triloba*, the candle-nut tree, and *Eugenia malaccensis*, the so-called 'native apple,' are most partial to the valleys, the former in some localities extending upwards to an elevation of 3000 ft. or more, the latter attaining only about half that height in the mountains. Both, but the former more especially, may form an important element in the true forest-belt, so as to have the appearance of indigenous plants. Their foreign nature, apart from other considerations, is evidenced by the absence of any special fauna in connection with them. Neither of them are unsuited as pabulum for indigenous insects, since some of the polyphagous species feed upon them and especially on the *Aleurites*, but they have no special fauna. With these the 'Ki' or 'Ti' (*Cordyline*) is often very conspicuous. Apart from these aboriginal introductions, as one ascends the lower slopes or valleys and there is an increase in the rainfall, the introduced guava may occupy the whole soil to the exclusion of all other trees or shrubs. Where the moisture is sufficient, the foreign grass, *Paspalum conjugatum*, commonly known as 'Hilo grass,' from the fact that it first appeared in that district of Hawaii, covers the whole ground; or in drier localities other equally indifferent grasses are in occupation.

There is no doubt that what one now sees on the dry lower slopes of the leeward side of the islands is but a remnant of a once more or less open forest land, which has had a very special fauna of its own. In addition to the trees already mentioned some of the more common components of the present continuous forest-belt extended down into this region, *Acacia koa* and *Metrosiderus* for instance. Only in special localities can one now get a glimpse of this fauna, for excepting a few wide ranging or hardy species, or such as are specially protected, all the native insects of this region have been destroyed either by imported predaceous insects or by the destruction of the forest itself, and the changes of conditions that have ensued. In a few spots there yet remain in Lepidoptera species of *Scotorythra*, *Talis*, *Thyrcopa*, *Hodegia* etc.; in Coleoptera *Plagithmysus* and special species of *Rhyncogonus*, *Proterhinus* and *Labrocerus*, together with some Hemipterous insects, Jassids and Fulgorids, quite peculiar to it. The loss of all but a remnant of this, no doubt, once rich and extensive fauna is much to be regretted, for it may be suspected that here some of the finest native species once occurred. Passerine birds regularly descended into the clumps of trees of this open country, as in fact we have ourselves noticed in special localities in past years. From these, in Cook's time, they passed still downwards, since we are told that several species were found frequenting the coconut palms on the beach. Achatinelline shells as well as other land Mollusca were no doubt numerous, in the upper part at least, of this region.

It is certain that in prehistoric, but comparatively recent times, the climate and vestiture of the lowlands of some of the dry districts of the islands must have been very different from the present condition. Thus at the base of the cone of Diamond Head on the coast a few miles S.E. of Honolulu are found extensive deposits of many species of land Mollusca (*Amastra*, *Leptachatina*, *Endodonta*, *Succinea* etc.), the species differing little, if at all, from those now living in the forest-clad parts of the Oahuan mountains. Similar deposits are found on the leeward side of the Waianae range at no great elevation above the sea and in various other localities. Such places are amongst the most arid to be found on the island at the present time. While *Succinea* can be found living near the coast in the driest localities, most of the other genera can thrive only where there is a liberal supply of dampness, and where the vegetation is dense enough to retain this. It is very important to remember that such different conditions have existed in past time, when one considers the possibility of the survival and establishment of any chance immigrants that may have reached the shores. Where the immigrant would now find a barren and arid region on its arrival, very different conditions may have existed in other times.

Above the lower dry mountain slopes, at elevations varying usually from 1200—3000 ft., one reaches the belt of continuous forest. Where undisturbed by man or beast, this is often so dense as to be impenetrable without cutting a pathway, or at least breaking through by force. Luxuriant growths of Ieie (*Freycinetia*) in many localities and in others wiry-stemmed ferns (*Gleichenia*) make progress difficult. The width of this forest-belt varies very greatly according to the locality and according to the destruction that has been the work of man. In some places no such forest-belt exists, in others it has been reduced to an open timbered country, covered with foreign grasses. This is the last stage preceding destruction, when the remaining trees produce their seed in vain, for the thick growth of grass prevents any young trees springing up to replace the old. We have known a forest so dense that it could be traversed only along a narrow made path, generally knee-deep in mud, to be reduced to open woodland by the ravages of cattle within a period of about fifteen years.

On Oahu (and elsewhere) the lower part of this forest consists or in past time has consisted to a large extent of the fine and valuable Acacia, *A. koa*, which altogether fails or becomes sparing in the highest forests of this island. On some of the islands (Molokai and Lanai) there is now no Acacia forest, though evidences of its former existence still remain. On the lofty mountains of the other islands the Koa may extend throughout the whole forest-belt, but it is wanting over extensive areas from natural causes. The Ohia, *Metrosiderus*, is the commonest of all forest trees extending both above and below the region of dense forest, and is the main constituent of the forests throughout the whole group of islands. It is extraordinarily variable, and can adapt itself to the most varied conditions of climate and station, to an extent indeed of which the Koa seems quite incapable. From one of the largest of forest trees it may become, on boggy mountain tops, a trailing shrub, or a small erect plant with simple stem no thicker than a pencil and bearing a single large terminal flower. Its variations under more normal conditions are very great, and it is presumably the parent of the other species of its genus that are considered distinct and endemic. Both the Koa and Ohia are of great importance to the fauna, since hosts of creatures are dependent on them. The former probably supports the larger number of peculiar forms, of which, no doubt, many have been exterminated by its extensive destruction. Throughout this forest-belt ferns, both epiphytic and terrestrial, are most numerous and varied, often covering the whole surface of the ground beneath the trees or clothing the trunks of the latter. Here the tree-ferns acquire their greatest size and beauty. The fauna connected with ferns is quite rich, not only tree-ferns but the lesser species also yielding their own peculiar insects. In the Rhyncophorous beetles a number of species of *Proterhinus* are restricted each to a particular species of fern, and tree-ferns support *Heteramphus* and *Dryophthorus*. Small crickets of the genus *Paratrigonidium* affect each their own special ferns, as do some Hemiptera (Heteropterous and Homopterous) and larvae of various Macro- and Micro-Lepidoptera feed only on these. Tree-ferns are a favourite resort of numerous Carabid beetles, and the dead fronds are the home of *Machilis* and many other creatures. It seems probable that in the islands the fauna attached to ferns is proportionately much more extensive than one usually finds to be the case elsewhere. For this reason some of the endemic birds are constantly to be found seeking for food on the stems and amongst the fronds, and some of the land Molluscs are also very partial to them.

It is not necessary to give a list of the trees and shrubs that form this compact forest-belt, for herein are found species of nearly all the important genera of plants, while many are altogether confined to it. Its components are very different in different localities, the difference depending in many cases on the nature of the soil or of the rainfall. In drier localities one will sometimes find a less dense and more varied forest than in a closely adjoining and wetter district, or a wetter part of the belt may be more varied in its vegetation than that at a higher elevation and with a lesser rainfall. Apart from the Ohia and Koa already mentioned the following are very important trees or shrubs to the student of the fauna: the arborescent Lobeliaceae, the Rutaceous *Pelea* and *Zanthoxylum*; *Cheirodendron* and other Araliaceae; the *Rubiaceae* generally; *Pipturus* and other *Urticaceae*; *Myrsine* (Myrsinaceae), *Broussaisia* (Saxifragaceae), *Elaeocarpus* (Tiliaceae), *Perrotetia* (Celastraceae), the Leguminous *Sophora chrysophylla* and an endemic *Rubus*. However, most trees and shrubs of this belt are more or less productive, and one may add to the above *Eugenia sandwicensis*, the numerous species of *Pittosporum*, *Santalum*, *Myoporum*, *Nothocestrum*, *Charpentiera*, *Pisonia* and the arborescent or woody Compositae.

On the highest mountains towards the upper limits of the forest there is often a very uniform flora, rich nevertheless in species of birds and insects. *Acacia koa*, *Sophora chrysophylla*, and *Myoporum sandwichense* sometimes form its chief components. Lower down *Metrosiderus* interspersed with lesser trees such as *Myrsine*, *Gouldia, Straussia, Pelea* and arborescent lobelias may be dominant. Naturally two such localities though adjoining one another have a vastly different fauna. Of the lesser plants found within the forest-belt, violets with woody stems, a giant *Gunnera*, the pink-flowered begonia (Hillebrandia), the liliaceous *Astelia*, and some of the endemic Labiates are the most likely to attract the attention of the non-botanist. On the summits of the lesser mountains (those not attaining 8000 ft.) there is sometimes developed a bog-flora, characterized by species peculiar to itself. Bog moss, endemic sedges, grasses, violets, *Drosera* and creeping and woolly forms of plants elsewhere erect and glabrous are characteristic. Such bogs are more or less evident on all the forest-clad islands, excepting Lanai, and even there one can see signs that such a condition formerly existed.

On the highest mountains of Maui and Hawaii the forest fails long before their summits, often snow-clad, are reached. Above its upper limit dwarf trees and bushes are found with ferns and grasses to which a drier climate is congenial. *Sophora, Santalum, Myoporum,* arborescent or shrubby Composites are common constituents, while the Epacridaceous *Cyathodes* and *Vaccinium reticulatum* cover much ground. Some of the endemic species of *Geranium* attract the eye by their silver foliage, while the silver-sword *Argyroxiphium*, a handsome and peculiar Composite, is found as high as 12,000 ft. A somewhat similar vegetation is found in some localities within the limits of the forest-belt, where extensive open lava fields occur and there is a lack of permanent moisture.

On the windward side the forest-belt on some of the islands has suffered less destruction than on the lee side and, if quite undisturbed, it still extends downwards to the cliffs that fringe the shore. Where the coast is not bounded by cliffs the lower slopes are usually denuded, but owing to the rainfall are green throughout the year and well covered with vegetation. The native fauna, however, as on the dry side of the islands has been mostly destroyed by change of conditions and the predominance of imported predaceous insects. The fauna of the windward side is, I think, contrary to what one might expect from the condition of the vegetation, poorer than that of the dry side, although the forest-belt (as on the slopes of Mauna Kea above Hilo) here reaches its greatest development. Wherever I have investigated, this is certainly the case so far as Coleoptera are concerned. However in the rain-soaked woods of the windward forests Lepidoptera are particularly abundant, as also are some Diptera, and the beautiful condition in which one finds the most delicate and minute moths, during the frequent torrential downpours is frequently a matter for wonderment. In such places more hardy insects, such as *Pyrameis tammeamea* and *P. atalanta, Deilephila wilsoni* and others, pay little attention to the heavy showers and may be seen active under such conditions during the day time, while moths in general are equally so after dark.

It is not necessary to give any special list of the fauna of the true forest-belt.

Herein probably nineteen-twentieths of the endemic species now existing have their home. Here will be found all the genera and species of Passerine birds and nearly all of the land Mollusca, especially the Achatinellidae. Very rarely do these latter pass above the 4000 ft. line above sea-level and then only in the case of a few species of one or two genera or subgenera. Other creatures appear similarly to keep within certain bounds as to elevation, the crickets of the genus *Paratrigonidium* and *Banza* (*Brachymetopa*) rarely passing the line just mentioned in spite of the continuity of the forest upwards. Unless the woods have been opened up by man or cattle, wasps fail to establish themselves in the wettest and densest of these. In some localities xerophilous insects and plants pass through dense and wet forests by means of the recent bare and open lava flows, which cannot retain moisture.

Above the forest-line on the highest mountains in the open country there is an insect fauna of species peculiar to the region, but it is very meagre as compared with that of the forest immediately below. This could scarcely be otherwise considering the limited character of the flora and the fact that so many of the insects are strictly attached to arboreal plants. Nevertheless, it is now a much more productive country than most of the open region below the forest, for the reason that its fauna has not been destroyed by introduced predators. In particular its species of Carabid beetles remain abundant up to an elevation of nearly 10,000 ft.

Wherever the soil and other conditions are suitable a great deal of the lowlands and lower mountain slopes are given up to the cultivation of sugar cane, which on the dry side of the islands is grown under irrigation, but in wet districts usually finds sufficient moisture in the rainfall. For the sugar plantations of dry districts water is procured either from the mountain streams directly, or by tunneling in the mountains, or by pumping from artesian wells on the lowlands or at low elevations. Where cane is not grown either for lack of water or other reasons, the land is often overrun with cattle both above and below the forest and in many cases the forest itself is invaded. Fortunately now that it is realized how cattle inevitably destroy all Hawaiian forests and cause the drying up of the watersheds, on which the entire prosperity of the islands depends, large areas of woodland have been reserved and all cattle excluded. Though this exclusion has not been carried out nearly as rigidly as one might wish yet there is reason to believe that what has been done and may still be done in this matter will preserve a great part of the endemic fauna and flora for future generations. Only the small islands of Kahoolawe and Niihau are beyond redemption so far as native vegetation is concerned.

Leaving out of consideration all foreign plants, whether imported by man or naturally immigrant, the lack of conspicuous flowering plants is a most striking feature not only of the forest but of the open country. Were it not for the natural immigrant, *Metrosiderus polymorpha*, the chief constituent of the forests, the latter would be sombre indeed. This tree with its abundant red flowers, when, as is often the case, it comes into blossom over large areas at the same time, presents a really bright appearance, and this effect is heightened by the large numbers of the common scarlet and crimson Drepanid birds that resort to the flowers for the sake of their abundant nectar. It is true that there are some other flowers, such as *Gardenia*, that are conspicuous and fragrant, or showy like the native species of *Hibiscus* and the begonia, *Hillebrandia*, but these are too local or infrequent to change the general impression. In open places the yellow flowers of some of the gregarious Compositae attract the eye, but in other countries would hardly be noticed as being more than a rather superior weed. *Freycinetia* in flower or fruit has for a short season a bright appearance, though in many districts nearly every one is devoured or befouled by foreign rats. Perhaps after *Metrosiderus*, the Mamani (*Sophora chrysophylla*) which grows gregariously and also attracts the red birds, makes the best show. Of the arborescent lobelias the flowers, though often large and numerous, are rather strange than beautiful; in many species they are hidden beneath or amongst the foliage and often they appear to decay almost before they are fully mature. On the other hand the ferns with a large variety of species, often of considerable beauty, are the more attractive from the absence of conspicuous flowering plants. Nowhere in the islands will one find any display of the latter comparable with that which is so usual in the meadows or open woodlands of countries outside the tropics.

Having spoken of the general inconspicuousness of the flowers and the bright colours of some of the commonest birds, we may notice the general aspect of the fauna. The greater number of species of the native birds have green, yellow or olivaceous plumage and are not conspicuous, though some of them are of strange or even grotesque form. Here belong the Drepanididae, but five genera (at least in some of their species) have red plumage either in both sexes or at least in the male. The Meliphagine *Acrulocercus* have mainly black or dark plumage, as do several of the Drepanididae, but none are entirely black, since red, white or yellow forms part of the colour pattern. The thrushes (*Phaeornis*) are of sombre colours, but the males of the fly-catchers (*Chasiempis*) are often prettily variegate.

The absence of gaily coloured native butterflies or diurnal moths prevents the insects from making any conspicuous showing. It is doubtful whether to ordinary observers there is, excepting the fine *Pyrameis tammeamea*, a single insect that would be considered beautiful. At least that species only can be said to represent brightly coloured insects in the way that *Vestiaria*, *Himatione* and others do the birds. The vast majority of the insects are utterly inconspicuous and unnoticed unless specially sought for. In most places, whether in forest land or in the open, one will observe the endemic bees or wasps, insects of small or medium size, mostly appearing black in life, and the species very uniform in general appearance. Their great abundance in many places, the dark, blue-shining wings of many of them and their activity by day attract our attention. In many woodlands and by the side of mountain streams some of the larger red-bodied dragon flies of the family Agrionidae may even be called conspicuous, while others like *A. nigrohamatum* have a remarkable appearance as they fly towards one, owing to the bright yellow colour of the face and the striking turquoise-blue of the eyes. Apart from these it is quite possible for the casual observer to walk through miles of forest and see not a single even moderately conspicuous insect. At the most, moths of insignificant size and appearance are frequently disturbed from tree-trunks or undergrowth, as he walks along. These remarks, it should be understood, will apply to localities, where there is in reality a rich endemic insect fauna, and serve to show its hidden nature.

The arboreal species of Achatinellidae, though not large, are many of them of very bright colours and even beautiful, but in the woods they are far from conspicuous. It is easy to imagine that any one not specially searching for these, or for other creatures in the same habitat, might pass them by daily without being aware of their existence. Even in the wettest weather they do not move around by day with the freedom of many land Molluscs of other countries. The terrestrial species are of sombre colour and well concealed, as also are many of the species which habitually frequent the trunks and branches of trees rather than the foliage.

The endemic spiders are mainly inconspicuous and many of the forms that frequent the trunks and branches of trees match their environment so well as to be nearly invisible. Others remain hidden beneath bark or between leaves spun together. Web-making species are often numerous in shallow caves or hollows in the sides of mountain ravines, or in the cavities of old tree-trunks, or they spin their webs near to the ground. Being so favourite a food of the Passerine birds, the arboreal forms especially, were they not well concealed by day, would have had little chance of survival. The great decrease in the number of native birds may well lead to an increase in the number of spiders, even if it has not already done so. Certainly, in 1892, individuals of the species living exposed on the limbs of trees on Hawaii, where birds were very numerous, were most uncommon.

Account of time spent in collecting and methods employed.

Before beginning a more special account of the Hawaiian Fauna it seems advisable to refer to the time that has been spent on the various islands of the group in collecting material. I arrived in Honolulu early in 1892 and during the spring months collected chiefly in the Waianae range of Oahu, partly on the eastern and partly on the west side of these mountains, but more successfully on the latter. Except for an odd day or two I did not attempt the Koolau range, which was the scene of most of Mr Blackburn's entomological field-work. Throughout the summer I was stationed on the west side of Hawaii, working chiefly on Mauna Loa, then a paradise for native birds, and to some extent on Hualalai. Collecting was done at all elevations from the dry coast, through the wet-belt, where heavy rain fell almost every day, to the higher and drier forest of 4000 ft. and upwards, and to the summit of Hualalai. The winter months of 1892—1893 were spent almost entirely on the western slopes of the Northern end of the Koolau range of Oahu, where the forest-belt was more extensive than elsewhere. This part of the range appears to me to be decidedly inferior for general collecting as compared with the Honolulu end, at any rate during so wet a winter as was this one, but here, if anywhere, there seemed to me to be a chance of meeting with certain birds, of which it was specially desired that specimens should be obtained. However, neither the 'Oo,' *Acrulocercus apicalis*, nor the species of *Hemignathus* and *Heterorhynchus* peculiar to the island and obtained by early collectors in the first half of last century, were to be found, either by myself or other ornithologists, and it may be that they had already become extinct there. This, with perhaps one or two exceptions, was as unsuccessful a collecting experience, as I ever met with.

In May 1893 I crossed over to Molokai and, the west half of the island being practically forestless, camped on the southern slope of the forest-bearing end, near the middle of the island. All animal life seemed abundant after my experience on Oahu. Common species of birds were plentiful, though not in the extraordinary numbers observed on Hawaii, and of course all the Mollusca and most of the insects were new to me. This was a very wet summer in the mountains, and for the first six weeks there was hardly a day without long and heavy rains in the woods a few miles behind my camp, and when it was not actually raining, these were mostly enveloped in thick fog, through which objects were visible only for a short distance. In spite of this, collecting was good. After a time I pitched a tent in the midst of the highest boggy forest near the back ridge of the mountains. From my different camps I was able to get to Kalae on the west, where I also made a short stay, to the valley of Waikolu, and down into the deep valley of Pelekunu, where I stayed for a time in the then native village on the windward coast. It was not till the autumn that I was able to leave Molokai, owing to the large amount of time spent in securing the rarer birds. And here I should state, that not only on Molokai, but elsewhere the scarce birds are without doubt difficult to get even in moderate series. I should consider that, both on Molokai and other islands, at least half of my whole collecting time was taken up in acquiring those that I obtained. For some of these birds it was necessary to be continually on the watch, and even then, and in the best localities, it was quite possible to spend weeks without seeing, or even hearing, a single individual. For this reason, until I had secured my specimens, I never dared to go about unhampered with gun and other necessaries for bird-collecting, even though I was specially in search of insects.

When it is considered how small and well-hidden are most of the latter, it will be easily understood that the many days spent specially in search of rare birds, for which both sight and hearing need to be kept constantly strained, did not result in a great accumulation of entomological specimens.

After my experience of the previous winter I concluded that it would be better to spend this season on the small and comparatively dry island of Lanai, the forest area being very small. Nearly all my extensive series of Lanai birds, shells and insects were obtained during these months. In March 1894 I proceeded to Maui, working with not too much success in the broken West Maui mountains, where I have invariably had bad luck from weather or other causes, and with satisfactory results on Haleakala. As I was returning to England for the winter I was unable to make a stay of more than two months, after which I went to Kauai and collected over the high plateau of the middle of the island and also to some extent on the lower and drier parts of the mountains. During this summer I revisited Lanai for a short period of camping and finally proceeded to windward Hawaii for a brief stay. At the end of the summer I left for England and for four months was engaged in working on the specimens, so far collected, and described the bees and wasps that had been obtained, this latter work being revised subsequently and published much later.

In the spring of 1895 on my return to the islands I first made a lengthy stay on Kauai, visiting various parts of the islands and afterwards went to Hawaii, collecting in the Hilo, Puna and Kau districts. In the winter months several camping expeditions were made on Mauna Kea, birds being the chief object. On two of these expeditions there was not a single day without heavy rain and the collecting was very trying. On account of the density of the forest, I had a gang of natives with me, in order to cut trails through the forest. They all suffered much from the wet and cold, it being impossible to dry clothes for sleeping in, and one of them met with a bad accident. On my last attempt, however, I had exceptional weather for two weeks and secured the bird I chiefly wanted, and some rather nice insects. In February 1896 I spent some time in a tent on the Waianae mountains, at a higher elevation than had been possible in 1892, and afterwards revisited Kauai (more than once), Molokai, Lanai, Hawaii and Maui. One of the Kauai expeditions, when I camped on the wet side of the island, was very poor in results, but other localities yielded well. In January 1897 some time was spent in collecting on the west side of the West Maui mountains, but this collecting was done under many difficulties. Leaving Maui, I camped out for some weeks on Kauai. Shortly afterwards I left for England by way of Arizona and Mexico. After working on the collections and completing the descriptions of Hymenoptera already referred to, as well as the Neuroptera, Orthoptera and some families of Coleoptera, I returned to the islands early in 1900. In this and the following year my work was almost entirely confined to Oahu. I rarely carried a gun, and paid little attention to anything but insects and mostly limited my observations to certain groups of these. Very little indiscriminate collecting was attempted. Beetles such as are easily obtained by indiscriminate beating of trees or by sweeping these, were almost all collected by special search, as I wished to obtain a more certain knowledge of their habits and particularly of the restriction of species to one food-plant, the variation of individuals found in company and that of different colonies. Practically all the specimens obtained were mounted, when freshly killed, and to a large extent examined at the time. Observations were made in widely separated localities and in both mountain ranges. During this period I had facilities for working at the specimens in the office of my friend Mr A. Koebele, the Government entomologist of the islands, who accompanied me on a number of my trips. Although, as has been said, my latter work was of a more special nature, yet more new species than might have been expected were obtained. The time spent by me in general collecting (i.e. excluding my last mentioned visit to the islands) did not differ much in the case of the four islands Kauai, Maui, Molokai and Oahu, averaging about eight months to each. On Lanai the small size of the island and its few species of birds only necessitated about four months work, but the great island of Hawaii consumed about twenty months, largely on account of its richness in species of birds, as compared with any other of the group.

All my collections were specially packed and shipped in Honolulu, and although practically all the Lepidoptera and many of the other insects were pinned, and must have received much rough handling in their several changes from steamer to train and vice versa, I think hardly a specimen was damaged or even shifted. A single lot unwisely sent by mail, for a special reason, was considerably damaged.

In 1902 and 1903, having ceased to collect for the Committee and become engaged in local economic entomology, I was able to visit several of the islands and collected a great deal of material, some of it still being unworked or undescribed, while some of the species are included in the systematic portion of this work. In 1902 I made an extensive investigation, by breeding them, of many of the parasitic Hymenoptera and in 1903 I paid a good deal of attention to the native leaf-hoppers (Homoptera). My account of the birds was published at the end of 1903 (Vol. I, p. 365). After this date except for occasional single days or for short periods I have done little field-work, and when working have nearly always had some special object in view, rather than to collect indiscriminately. Though greatly occupied with economic entomological work I completed the Anobiidae (published in 1910), a group of beetles on which I had been occupied, as occasion offered, for about ten years, and wrote supplementary papers on other Coleoptera and several of the other Orders. As to the groups of insects, which have been worked out for the Committee by well-known specialists, in most of these I have had occasion to determine large numbers of species, or even considerable collections, the material having been collected both by myself and others. I have thought it advisable to refer at this length to such work as I have personally done in connection with the Hawaiian fauna, both in the field and study, because on this are based the conclusions that I have arrived at in this Introduction. From observations of a less wide nature or limited to a single group I might have arrived at other conclusions.

It has already been said how much time was taken up in the search for some of the rarer birds and in the acquisition of a good series of specimens of these. As to the insects far more time was given to a special search for Coleoptera than any other Order. After the beetles the Microlepidoptera probably occupied the most time. Many of these were collected in very wet and sometimes windy localities and as they could not be carried alive in so rough a country without damaging themselves, I found it necessary to kill and pin them, as soon as they were caught. Liquid ammonia was always used in killing, except for stray specimens picked up, when I was specially in search of other insects or of birds. It was often necessary to carry an umbrella in order to obtain shelter from the wind and rain, when pinning the specimens in the field. On comparatively few days the Hymenoptera claimed my whole attention, these being (at least the Aculeata) conspicuous and easily collected, and this also applies to the Odonata. The Neuroptera, Orthoptera, and Hemiptera, as represented in our fauna, are naturally met with in collecting beetles and now and then I spent a day strictly in catching the larger Lepidoptera. To the Mollusca on Molokai and Lanai I paid a good deal of special attention and very special attention to certain species.

As to the modes of collecting the most successful are exactly those which would be employed by a successful collector in any other country, the difference between the islands and most countries being that many situations, which might be expected to produce a good harvest, will be found comparatively barren. Very few species of Coleoptera will be swept from low herbage, even in the finest localities. Sweeping, when employed, should be rather done amongst the branches of trees and shrubs. This is very natural, seeing that nearly all the beetles are attached to, or bred in wood, dead or alive, but chiefly in dead or diseased trees. A good many of the species sun themselves on the foliage of living trees and shrubs, but rarely descend to low plants. Comparatively speaking, very rarely is any beetle seen upon the wing. These remarks of course apply solely to the endemic fauna. Light is very attractive to Lepidoptera, both large and small, and especially in wet localities, no doubt for the reason that in these, dark cloudy nights are most frequent. Clear cold nights are almost useless, and worse still if there is a strong wind. Even the smallest moths will sometimes come freely during very heavy rain, and a black windless night with torrential downpours, which cease at intervals, are the very best, during those intervals. Even the butterflies, *Pyrameis tammeamea* and *P. atalanta* sometimes are not infrequent visitors under such conditions. Flowers are attractive to many moths both by day and night, especially the Ohia (*Metrosiderus*) from which at night some kinds may be shaken to the ground, either unable or unwilling to fly. The usual bait of sugar, tried at various times, in good localities for *Agrotis*, failed to attract anything except the little *Hypenodes*, so similar to the European one, which, as is well known, is itself very freely attracted. Fern-fronds in a certain stage of decay are very attractive to *Agrotis*, and when feeding on these they make no attempt to fly, but fall to the ground, when disturbed. Aculeate Hymenoptera and Odonata do not need looking for, but it needs a practised eye to distinguish the very similar species of the former, so as to be able to pick out the rarities without a wholesale slaughter. Flowers, except a few fleshy kinds that easily decay, are not attractive to beetles, excepting some species of Nitidulidae and the Elaterid genus *Eopenthes.* The minute and obscure Diptera, the endemic species largely consisting of small Dolichopodidae, which shrink and distort on drying, and of infinite numbers of *Drosophilidae,* many of these also becoming distorted, have been little collected.

It is quite certain that only a fraction of the fauna has yet been collected, and that the groups are very unequally known. The small group of native dragon flies may not be greatly added to and the aculeate Hymenoptera are fairly collected, both of these being as one might almost say obtrusively present as a whole, as compared with other insects, of which but few species are both numerous and conspicuous at the same time. On the other hand three hundred species of *Drosophila* would be a moderate estimate of those existing. It is possible that half the number of existing species of insects have been collected, but this is by no means certain.

During the last ten years, since the annexation of the islands, it has gradually become much more easy to get about than was the case during the chief period of my collecting, and many mountain localities have been opened up, which before were impossible for the collector or at least very difficult of access. At the same time the existing forest is being much more strictly preserved from destruction.

I did much of my collecting from a small tent, which, usually, I had packed for me on horse or mule over the lower slopes to the lower edge of the forest and from that point packed it myself with the necessary supplies and collecting apparatus into the heart of the forest. Skinning birds and pinning insects while either sitting on the ground or lying down was at first troublesome, but after a time seemed natural enough. In some very wet forests, where I had to spend much time for the birds, I was obliged to carry a limited supply of oil and a small oil-stove on account of the difficulty or impossibility of making a fire on my arrival at night after a long day's collecting, during the continuous and heavy rains. But such cases were exceptional, and otherwise, after a little practice, it was always possible to build a fire in the open (even in very wet weather) for the purpose of cooking rice,—practically the only cooking that the habitual camper-out need attempt. This with coffee and sugar and one or two kinds of tinned meats (in addition to a tent, clothing and apparatus) will be found as much as the collector will care to pack on his back in so rough a country, and I found the stove and oil a sore burden, very reluctantly assumed. Except for very special purposes I never took a native with me on these camping expeditions, partly because it was almost impossible to get one man to go without companions and partly because the impedimenta would be proportionately increased as the number to be fed and sheltered was added to. In some of these untrodden forests many of the birds (excluding the most wide-ranging species which seem generally to have more or less fear or shyness of man and the little fly-catchers, which are everywhere very tame or inquisitive) were absolutely fearless, and it was only just not possible to touch them with the hand. Sometimes it was quite impossible to shoot a rare species, since it would keep following up the collector, as he moved away, perching overhead at only a gun-length's distance. Then, its curiosity satisfied, it would fly off altogether and be lost in the density of the brush. Excepting in the more open forest, in the neighbourhood of ranches, the woods are quite uninhabited, and sometimes for weeks together I never saw a human being. Occasionally a native would come up and leave letters for me or take them down from my tent, but usually I was away collecting, when he arrived.

Hawaiian islands much richer in species than has been supposed, and the scarcity of individuals of species exaggerated.

Oceanic islands are generally said to produce but few species of native insects, but their unproductiveness has certainly been exaggerated, owing to the hidden life and small size of so many of these inhabitants. It has also been supposed that individuals of the species are as a rule and comparatively speaking rare. In the case of the Hawaiian islands, and probably of most remote oceanic islands, the insects and other animals are limited to a small variety of types compared with other lands, but the types represented are often extremely rich in species, which, one might almost say, do their best to fill up the vacancies caused by the absence of many forms of life almost ubiquitous elsewhere, but which have never reached these remote islands. When talking to the late Dr Ashmead, who visited the islands in 1900, he insisted that certain large groups of parasitic Hymenoptera, of which he had a specialist's knowledge, must, being of universal distribution elsewhere, be really well represented in the islands, though no species (excepting a few evidently imported) had ever been collected. But in reality it is not at all surprising that these do not occur. Firstly the chances of any vagrant insect, carried across the ocean either by wind or wave, happening to land on a few small spots in mid ocean must be very small, and then the possibility of its acclimatisation has to be considered. We know from practical experience that many insects, which it has been desired to introduce, fail to establish themselves in this climate. If a plant-eating species, it may find no fit vegetable food, if parasitic, no fit animal food. But in the case of such specialized creatures, as most parasitic insects, unless either a number of the host, they feed upon, has arrived with them, or previously, and become established, or unless there happens to be some other insect present, which may serve as a new host, the chance of a successful occupation by a parasitic insect is very small.

The paucity of individuals of a species is also, I think, much less than has been supposed, this supposition being due to the small size, hidden life and special habits of many of the creatures. I do not feel sure whether the number of really rare species is greater than is the case elsewhere *over an equal area of land.* On large land areas a species may occur in very small numbers, but persistently, over a limited portion of the area, while in other parts removed from this, it may be continually abundant, and small islands do not afford these conditions. On a continental land if one picks out a continuous area, equal in size to one of our islands, there will be found large numbers of rare insects, even in countries much more collected over than the Hawaiian group. It is natural that a collector in a country of great roughness and with extensive virgin forests, collecting in a limited time not only all kinds of insects, but all other land animals, will obtain many unique specimens and also species represented by only one or two examples, both from lack of time to make special search for each particular species and because many insects even though they have no regular season, become more abundant at one period than another and the best time may be missed in a particular locality. Also in pathless forests, where a species is very local, and particular as to the exact condition of its surroundings, it is often not possible to find again the exact place where it happened to be met with. In restricted localities, that have been often visited and collected over, most of the species have at some time or another been found in some numbers and many in abundance. Again the personal equation comes in. The collector particularly fancies certain species and devotes much time to these, while others he is liable to neglect, in so far that he picks up only a few specimens. For this reason the number of specimens cited as captured, in the systematic portion of this work, should not necessarily be regarded as showing the rarity or otherwise of a species. For instance, the conspicuous dark-coloured, day-flying moth, *Dasyuris holombra*, of which two specimens are recorded, I observed in hundreds, if not thousands, on one occasion, flying in the forest on Maui, but being always hampered with a gun and much occupied with birds, I neglected to catch a series and did not again have the chance. A number of species of beetles, of which I captured long series, are undoubtedly amongst the rarest Hawaiian insects. My experience in this matter is different from Mr Blackburn's, who says "the very common insects" are "few indeed and the rather common ones almost none at all." We should rather say (speaking of course only of the endemic fauna) that the rather common species are numerous, the excessively common ones, less so, though there are a considerable number of these. He also remarks that "It is by no means an unusual thing to pass a morning collecting on the mountains (at any rate on those under 3000 ft. high) and to return home with perhaps two or three specimens secured, and having seen literally nothing else except the few most abundant insects." I am quite sure that this must be due to his having neglected to get beyond the range of the small ant *Pheidole megacephala*, before beginning to collect. A coleopterist of some experience in island work (and perhaps even without this) in the mountains close to Honolulu may take about forty species of beetles in a fair day's work, between 1500 and 2000 ft. elevation, though he has a considerable walk to and from the collecting ground. Almost the last day I collected in that locality, I took exactly that number of beetles (*Cis* 6 species, *Proterhinus* 10, Carabidae 5, Curculionidae 7, Histeridae 1, Cerambycidae 2, Staphylinidae 1, Nitidulidae 7, Anobiidae 1) in addition to numerous other insects, and had it been a different season, stray species of Elateridae would certainly have occurred. I do not doubt I must often have exceeded this number of species, especially as on this occasion I was by no means well and really unfit to attempt collecting in the mountains.

It has been suggested that close interbreeding may result in diminished fertility and in a paucity of individuals of island species, and that such interbreeding is very common there is no doubt. But whether in insects this inbreeding has any such result is extremely doubtful. We can feel quite sure that some of the introduced insects in the islands have originated from one or two, or very few individuals, accidentally imported by man, and of others imported for economic reasons we know this to be the case. Yet though some of the former were introduced at least half a century ago and have produced probably at least several broods a year ever since, and some of the latter complete a generation each month or even more quickly, these all remain as common as ever and show no sign whatever of degeneration or impaired fertility. Of imported insect pests it is sometimes said in a careless manner that these naturally disappear or become insignificant in time from being "played out," but I do not doubt that careful investigation will show that in such cases the real cause of decrease is that they become attacked, after a while, by other insects or diseases, and especially by parasites and predators, which transfer their attack by degrees from native species to the foreign immigrant. Deterioration in insects, supposed to be due to inbreeding, is much more probably due to the ill-effects of the unnatural conditions of captivity. The extreme sluggishness of so many of the insects and Mollusca leading to great restriction of locality, which we observe also in the birds, must lead to extreme inbreeding. We have observed colonies of some of the flightless beetles to persist for years in a single tree and where these colonies are isolated from others, no doubt all the inhabitants have resulted from a few stray examples, probably often from one. While the food remains in suitable condition these isolated colonies thrive and become very numerous, but they are, doubtless, often totally exterminated when it becomes no longer suitable, unless, by chance, individuals can reach some other tree fit to supply a breeding ground. Obviously this sluggishness and restriction of range must itself diminish the numbers of individuals of a species, and the tendency of island creatures to limit their range and to specialize their habits is a striking feature of the fauna. Loss of the powers of flight is a very common phenomenon in this connection.

Number of species of insects and causes of extinction.

The total number of Hawaiian insects known to me at the present time is about 3325, but of these only about 2740 can be considered as belonging to the natural fauna. Owing to man's interference and his introduction of foreign creatures, I should consider that about 300 species have been exterminated, without being collected. Mr Blackburn's and my own collecting, together with some aid received from others, has in my opinion resulted in the collection of about half of the existing species of native insects, so that a perfect collection of this section of the fauna, made before man's interference, might have yielded about 5780 species. I may have somewhat underestimated the number exterminated.

It is known that several species of Passerine birds, formerly abundant, had become either totally or nearly extinct before I came to the islands, twenty years ago, and there is reason to fear that several others may since have disappeared. At any rate, we know certainly that some, which were abundant, have become much less so, and have totally disappeared from localities where they were common enough. In my paper on the birds (Vol. I, p. 393) I have referred to the causes which have brought about this extinction or diminution in numbers. As with the birds, destruction of forest has, doubtless, caused the disappearance of many local insects, but even of greater importance has been the introduction of foreign carnivorous species, especially of the dominant ant, *Pheidole megacephala*. There is no record of the time when this destructive creature was imported, but even during the last twenty years it has occupied some considerable areas previously free from it. It may be said that no native Hawaiian Coleopterous insect can resist this predator, and it is practically useless to attempt to collect where it is well established. Just on the limits of its range one may occasionally meet with a few active beetles, e.g. species of *Plagithmysus*, often with these ants attached to their legs or bodies, but sooner or later they are quite exterminated from such localities. It is quite certain that native beetles and many other insects are absent from the localities occupied by *Pheidole*, solely on account of its presence. In several instances, as the ant has been observed to occupy a new area, this area having been collected over before it was present and yielding many native beetles, the latter have entirely disappeared. In a few low-lying localities, even close to the coast, there are some places, which from excessive dryness and other causes, the *Pheidole* is unable to occupy, at any rate permanently, and yet unfavourable, as these are, for insects of any kind, here only will native Coleoptera be found. On one occasion I came across an instructive instance of the effect of these ants on the native fauna. A more or less open piece of forest at an elevation of 1500 ft. above sea-level, with a large variety of trees scattered in it, appeared at first sight an excellent spot for collecting native insects. A number of native Hymenoptera were seen flying round the foliage, hardy insects which the ants cannot exterminate, though they are often seen attached to them by the mandibles. Every tree trunk was invaded by *Pheidole*, and beating the boughs dislodged them in thousands. Not a single beetle nor any native insect was obtained from these trees. One solitary tree, however, for some reason was quite free from ants. It was a large *Bobea*, with hanging masses of 'Maile' (*Alyxia*) dependent from the boughs. From the dead stems of this were shaken hundreds, if not thousands, of one species of *Proterhinus*, others also being present, as well as the large weevils, *Rhyncogonus*, and other kinds of beetles. I visited this spot on many occasions for the sake of a rare species of wasp, but never obtained a beetle except from this one tree, and a year later it too was occupied by *Pheidole* and barren of native insects. Fortunately *Pheidole* is not universal in its distribution. It can in some localities just attain 4000 ft. in the mountains, under certain climatic conditions. Below twelve or thirteen hundred feet it often occupies most of the islands, excepting some extremely arid localities. Though not so utterly destructive to other insects as to the beetles, yet many of them are destroyed by it, and generally speaking, collecting is very poor, where it abounds. Most of the native species taken in such places are vagrant, like Lepidoptera, and have bred in some adjoining area, either free from this ant, or where it is comparatively sparse. Miles of attractive forest in some parts of the islands are almost devoid of native insects, through its destructiveness. A very few endemic insects seem able to breed in its haunts, even where it is quite abundant, but many of the foreign or imported insects flourish in spite of it. It is not probable that it will spread to any great extent beyond the limits now occupied, for it has long since filled all suitable localities. Here and there the opening up of limited areas of forest may by change of conditions allow it to colonize these, but the great bulk of the forest is now reserved and not likely to be opened up. There is no reason to suppose that the endemic insect fauna will suffer any considerable further diminution, and it may, so far as one can see, remain as it is for ages to come. The chief danger would be in the introduction of some predaceous creature like *Pheidole*, which would be able to occupy the great area of forest land and the country above this, where *Pheidole* does not now exist. As no such insect has been imported in the course of the last century, it is on the whole improbable that it ever will be.

Comparison of 'introduced,' 'immigrant' and 'endemic' insects etc.

In a memoir on the Hawaiian Coleoptera, published in 1885, by Blackburn and Sharp, the beetles are divided into three classes: (1) 'introduced,' i.e. species imported by man, (2) 'immigrant,' i.e. species occurring elsewhere, but which have reached the islands by natural means, (3) 'autochthonous,' i.e. species peculiar to the islands, for which I have used the older and more often employed term, 'endemic.'

Owing to our very incomplete knowledge of the insect fauna of the world, some of the introduced species and also some considered to be immigrant are not yet known outside the islands. The ant *Prenolepis sharpii* for instance, which was imported years ago in boxes of plants by the Commissioner of Agriculture of the islands, and soon became established and very common, was described from descendants of these imported examples.

In judging whether an insect has been introduced by man, when the actual fact of its importation is unknown, I consider the following points.

(1) If solely attached to foreign vegetation or parasitic or preying on imported creatures only, it is certainly 'introduced,' or (less probably) 'immigrant.'

(2) If, being a beetle or Heteropterous bug, it is found within the range of certain foreign predaceous insects, it may in the case of the former be considered certainly and in the case of the latter most probably 'introduced' or possibly 'immigrant.' In explanation of this I may state, that in the case of the truly endemic beetles, without exception, and usually of the Heteroptera, the area of distribution is absolutely fixed by the non-occurrence of imported predators. Owing to interference by man these predators may come to occupy new areas, and then from these too the above-mentioned endemic forms disappear. At first, in such cases, many of the endemic beetles will be found actually being attacked by these enemies, but subsequently they will disappear. Some insects, however, e.g. bees and wasps and some Lepidoptera, more or less successfully resist such predators, and though endemic, can occupy the same area, as also can others that rarely or never are attacked, e.g. certain Homoptera that excrete honey dew.

(3) Doubtfully endemic insects may occur outside the range of foreign predators and mixed with many truly endemic ones, but usually they also range into the territory occupied by the former. If not, their habits should be considered and their food, and the probability of their being imported by man, but if they do so they are most likely 'imported' or 'immigrant,' and surely so if Coleopterous.

(4) Actual affinity to, or remoteness from outside forms must always be considered.

(5) Whether the species is isolated from other members of the fauna, or whether one or more closely allied forms occur is most important. When several closely related species are found in the islands the probability of their being endemic is very great. Importations by man usually consist of very different insects and not of closely allied species, and the same would be likely to be the case with natural immigrants.

A careful consideration of such points in the case of any insect that is fairly well studied, will usually leave little doubt as to whether it is endemic or introduced. It is perhaps more difficult to distinguish the immigrants from either the endemic or the imported species. We must, however, except from this statement a number of species of known migratory powers, well-known species elsewhere, with great powers of flight, and clearly natural immigrants. Excluding these, the number of immigrants is probably very small, for reasons hereafter given.

Whereas the imported species are in most respects of little interest as compared with the immigrant and endemic, in one particular they are of considerable importance, especially such species as have been established in the islands for many years. Household pests, however, and some others, that we know have been imported again and again, are of no interest. It is probable that such introduced species as the Longicorn beetles *Lagocheirus obsoletus* and *Astrimus hirtus* were established from a single importation of these species. They are evidently not frequently carried by man, for until recent years the former had not spread to the other islands and the latter has not, as far as is known, yet reached them. Yet the former is known to have become so plentiful, as to have been an injurious insect in Honolulu forty or fifty years ago, and the latter has been established at least for thirty years. Though for all these years inter-island traffic has been very heavy, and plants continually taken from one island to another, and especially from Honolulu, where these beetles are common, yet the spread of *Lagocheirus* has been slow, and that of *Astrimus* has not, so far as is known, occurred at all, as stated above. It is, therefore, very unlikely that either of these beetles has frequently or even occasionally been brought to the islands from outside countries, seeing that the traffic between these and Honolulu has been, until recently, comparatively very infrequent. I suspect, too, that these beetles are likely to be more abundant with us than in their native countries. Owing to the equability of the climate, on account of which so many insects breed the year round, and often produce many broods in a year, many species have passed through very many generations since their introduction. Some of the imported creatures we know from observation complete their life-cycle in three weeks, and brood follows brood without cessation. Yet, when we examine examples of these species, we may well feel some astonishment at the fact that they quite resemble those found in their original home, even though this differs greatly in climate and otherwise, and they exhibit no particular variability. Some (e.g. certain Coccinellidae) notably variable in their native homes, appear to exhibit even less variation here than in their own country. Looking at the imported species as a whole, we must allow that these show no tendency to special variation, and there is not the least reason to suppose that the variability seen is greater than, or different from that, which they exhibit in their native homes. One is struck with the stability of specific characters, and a study of these imported insects as yet throws no light on the question as to whether variation arises suddenly or by slow degrees in a species. One would infer that much time is as a rule required for the appreciable modification of a stable species.

The immigrant species are of two classes like the introduced ones: (1) those that are, doubtless, more or less frequent immigrants (*Pyrameis cardui*, *Nomophila noctuella*, large dragon flies etc.) and (2) those which are chance immigrants, of which no second immigration would probably take place in ages, if at all. At any period of the history of the islands these chance immigrants must be very few in number, for reasons stated elsewhere, and owing to the obscure nature of the fauna (obscure insects being very imperfectly known in other tropical countries) we cannot be sure whether certain species suspected of being immigrants are really so, as they have not been detected elsewhere, and they may in reality be endemic. This is unfortunate, because they are the potential ancestors of future endemic forms. Thus the Cossonid beetles *Deinocossonus* and *Orothreptes* are possible immigrants and so are such species as *Prays fulvocanellus* in Lepidoptera, but they have not been recorded from other countries. A very few species, e.g. the Tortricid moth, *Bactra straminea*, are almost certainly immigrant. If we examine these supposedly immigrant species and in conjunction with these consider those endemic ones, which are little modified from outside forms, and therefore are to be considered as a development from the more recent immigrants, we find a very different condition from that above noted in the case of introduced species. There may be a few constant species amongst these, and this may be due to the fact that such have been comparatively a short time in the islands and are the most recent natural immigrants, but these are certainly very few. We at once note the large amount of variability exhibited by the species. In this connection we may review a few species, which are either the sole representatives of their genus (and not, or very little, different from the outside forms) or at least have only one or two other species related to them in the islands. In the Aculeate Hymenoptera, the small ant *Ponera perkinsi*, hardly separable from foreign species is the sole native representative of its group. It is widely spread, occurs in many localities from near the coast to above 4000 ft., and exhibits considerable variation. There is sometimes a distinct tendency to specialization in variation in different localities. In the parasitic Hymenoptera, *Echthromorpha maculipennis* varies very greatly and individuals might at first be taken to represent distinct species. The small cockroach *Phyllodromia obtusata* is notably variable, so as almost to have given rise to a distinct species in parts of the island of Molokai. The earwigs listed under the names of *Anisolabis pacifica* and *maritima* in the systematic portion of this work, the former possibly endemic and the latter immigrant, are variable. The forest-frequenting species of *Calotermes*, which I expect will prove to be peculiar to the islands, exhibits notable variation in different localities. *Bactra straminea*, a New Zealand moth, is excessively variable and I consider that some of its local forms will probably prove to be distinct species. Another small moth *Hypenodes altivolans*, some varieties of which differ very little from the widespread *H. costaestrigalis*, is extraordinarily variable. The Pentatomid bug *Oechalia grisea* varies very greatly, and there is at least one offshoot of this, of restricted habitat and forming a distinct species. In birds the native duck, possibly a puny descendant of *Anas boschas*, is so variable that some ornithologists have supposed we have more than one species. In beetles *Pentarthrum prolixum* and the *Parandra* are variable forms. It is of course possible that all these may have been variable on their arrival in the islands, or are the descendants of variable immigrant species, but the variability in this class (i.e. immigrant species or comparatively recent developments from immigrants) is so very general, that this seems improbable, comparing them with the species accidentally introduced by man.

The endemic fauna of the islands consists for the most part of genera containing an inordinate number of species, evidently allied to one another, e.g. *Scotorythra* and *Hyposmochoma* (Lepidoptera), *Proterhinus* (Coleoptera), *Nesoprosopis* (Hymenoptera), *Anomalochrysa* (Neuroptera), *Paratrigonidium* (Orthoptera), *Drosophila* (Diptera), *Achatinella* (Mollusca), and many others. If the genera are weak in species they are generally, if isolated in the fauna, highly peculiar in structure, or they are evidently merely offshoots from some of the larger genera. In the Passerine birds the genera are numerous, but they are mostly weak in species. The large genera of insects and shells often consist of many variable species, though in these large genera some of the species are generally stable. More rarely there are genera, containing many species, few or none of which are conspicuously variable, at any rate not sufficiently so, as to cause any serious difficulty in defining the species. Probably these genera of stable species have reached the furthest point of development possible under the existing conditions in the islands. If we examine the series of allied forms of the Passerine birds, as they exist to-day, we see that a large number of them have reached such a stage of specialization for a certain mode of life, that we can hardly conceive that they could under any circumstances give rise to new forms. These could at most arise from some of the more generalized. Possibly the same is the case in the large genera of insects, of which the species are in a stable condition, though we are unable to appreciate the relationship of structure to habit as easily as we can in the birds.

Distribution of animals by natural agencies.

All the islands being volcanic and having been built up from a great depth of ocean at various periods, their entire fauna naturally originated from immigrants derived from other lands. These immigrants must have arrived either by flight, like the birds, or in drift like the flightless insects and probably the land Mollusca. Some of the flightless insects, however, that we now find in the islands, have no doubt lost their powers of flight after their arrival, or more properly speaking are the descendants of well-winged ancestors, and in this respect are similar to the little flightless rail (*Pennula ecaudata*) now extinct, but others, for instance some of the genera of weevils were, equally certainly, flightless when they arrived. These can only possibly have reached the islands in drift. That insects can pass over enormous distances in floating logs of timber can be seen from the study of the little weevil, *Dryotribus mimeticus*, whose natural home appears to be in drift-wood, and which not only occurs in Florida, but in the Hawaiian group and in Australia. In the case of the Hawaiian fauna many of the winged insects might quite possibly have been transported in this manner, for in their larval stages they live in the wood of dead trees, or beneath or in the bark, or they frequently, even if leaf-eaters as larvae, creep into the cavities of dead branches or beneath the bark to pupate. It is only necessary to look through the various families of insects, the habits of which are recorded hereafter, to see what a great proportion might have been carried in this manner. As is well known the common drift of the islands, derived from outside, consists of coniferous trees from North-West America, but few and probably none of the elements of our fauna can have been derived thence. Our insects have no relationship with those from that quarter, and it is unlikely that such drift would bring insects that would become acclimatized in the islands. Roughly speaking the Hawaiian fauna may be said to have been derived, so far as we can judge from its affinities, from immigrants received from the warmer parts of America, from the Australian and South Polynesian islands, and from the Oriental region. I do not place much importance on the fact that there is certainly no regular deposit of drift wood from any of these regions at present on the island shores, for with our scanty representation of types, it is only necessary that once in thousands of years an immigrant-bearing trunk or log should reach them. Certainly a careful consideration of the components of the Fauna would lead us to believe that this must have happened. Dr Guppy places little importance on drift in his considerations of the origin of the Hawaiian flora and very great importance on the birds; but when I consider how often I have found great numbers of seeds held beneath the dead bark of trees in the mountain forests, I cannot overlook the possibility of original components of the flora having arrived this way, as have those of the fauna. Further when one considers that even in our limited fauna, a single tree trunk may contain a score or more of distinct species, beetles and their larvae in the wood and bark, caterpillars boring the wood or living beneath the bark, well-sealed nests of bees and wasps, often in old beetle borings, with possibly Mollusca adherent to the bark, or beneath it, or wedged in crevices, besides other creatures and perhaps parasites of some of these, we may fairly suppose that once in a long period, some such micro-fauna may have been washed out to sea and stranded on these islands, and that some at least of the emigrants have survived and become established.

Though the distance between the islands and other lands is so great, yet we know that, like the migrant birds of Alaska that regularly visit the islands, certain insects of migratory habits like the large dragonflies, the butterflies, *Pyrameis cardui* and *huntera*, the small moth, *Nomophila noctuella*, and others have been able to reach the islands, and probably still do arrive from time to time, so we need not feel any difficulty in believing that at some period a lesser-sized dragonfly (Agrion) or an ant-lion (*Formicaleo*)—insects which could only have arrived on their wings—have been able to traverse a similar expanse of ocean by some rare chance. In many cases the winged insects may not have arrived this way, because in their earlier stages they could well have been carried like the flightless beetles and wingless animals. Over what distance minute and delicate winged insects can be wind-borne is not known, but probably under favourable circumstances it is very great. Some small moths, as reported by Muir and Kershaw, are able to rest on the sea and again take wing, but such cases are probably rare, and I imagine this faculty would not be of much aid in traversing such great distances as we require. High and steady currents of air are probably most efficient. A number of the existing species of moths are of powerful flight and are partial to wind-swept country, and it is a familiar sight to see these, when disturbed, allow themselves to be carried far away on the strong wind. Given this habit of allowing themselves to be thus carried, small moths might even be able to pass over greater distances than heavier-bodied species. In the interisland distribution of species whirlwinds may have occasionally assisted. These are most frequently observed on the plains, and I have recorded how even so strong a bird as the imported *Acridotheres* may be carried up many yards before it can extricate itself. These whirlwinds have been seen to carry up thick columns of dust to an elevation of over 2000 ft., and we have once or twice observed them to originate at this elevation in the mountains. Small creatures carried up in this way and meeting high currents of air might be borne for great distances before alighting.

Flightlessness in Hawaiian insects.

Amongst the Hawaiian insects there is a very large number of species in which either one or both pairs of wings are so reduced as to be useless for purposes of flight, or the hindwings may be entirely wanting. These cases in which we may suppose the loss of the powers of flight to have originated within the islands themselves are of considerable interest, and we may briefly review the insect fauna from this point of view.

In Lepidoptera one case of flightlessness only has been so far observed, that of the large Gelechiid moth, *Hodegia apatela*, the female of which has all the wings so reduced as to be quite useless for flight. The male is not known, but it is very probably fully-winged. This genus is merely an offshoot of the endemic fully-winged and dominant genus *Thyrcopa*.

In Diptera, flightless forms are, so far as is known, confined to the Dolichopodidae, several species (probably of two genera) having these organs reduced to mere filaments. One of these, *Emperoptera*, is an active and brightly metallic little fly, living on the ground beneath forest trees; the others are, I believe, sluggish, and live in very wet moss, clothing tree-trunks in dense wet forests. These are, I suspect, derivations of the genus *Campsicnemus*, and are undescribed.

In the Hymenoptera, apterous forms are mostly such as are found in other countries, but the flightless Diapriidae were probably derived from allied fully-winged forms such as still occur with them. In the flightless species intermediate conditions of the abortion of the organs of flight are known.

In the endemic Heteropterous bugs, one species of *Metrarga* has become apterous, and a large section of the genus *Reduviolus* (Nabidae) is quite flightless, as are the terrestrial members of the family Emesiidae. The species of *Acanthia* have the wings, so far as is known, always so reduced as to be useless for flight. In the Homopterous bugs many or most of the endemic Delphacidae appear to be always flightless, and if winged forms are produced at all, it must be at very rare intervals. Some, however, are always fully winged, so far as is known.

The Neuroptera contain the remarkable endemic genera of Hemerobiidae *Pseudopsectra* and *Nesothauma*, both flightless, the former with minute hindwings and the front pair not greatly modified, while the latter has these hardened and sculptured, so as to resemble more nearly the elytra of beetles. These genera appear to be derivatives of the more ordinary *Nesomicromus*, a dominant genus in the islands.

In the Orthoptera, the Locustid genus *Banza* (*Brachymetopa*) are all flightless, while in the Gryllids all the little crickets of the genus *Paratrigonidium* are wingless, and flying individuals are never developed as dimorphic forms, in the way that we have observed in some Trigonididae of other countries. All the prognathous crickets (*Prognathogryllus* and allies) are flightless, but the wings are so far developed in some forms as to suggest that their present condition has been reached in the islands, while others are without rudiments of wings and almost without tegmina.

Turning to the Coleoptera, in the Curculionidae, the genera *Oodemas*, *Heteramphus*, etc., containing only wingless forms, are so isolated in structure that one cannot tell whether their winglessness has originated in the islands or whether the forms, from which they were derived, were wingless when they originally reached the islands, but the latter may have been the case, as with *Rhyncogmus*, the foreign species of which are also wingless. The extensive genus *Proterhinus* consists of wingless forms, whereas the foreign *Aglycyderes* is winged. Unfortunately I did not examine the unique example of Samoan *Proterhinus*, which possibly is a winged form, and the specimen is not at present accessible to me.

Of the Cioidae many species are flightless and some of these have a remarkable superficial form, and have been segregated under a new generic name, *Apterocis*, but other species, still left in the genus *Cis*, are also flightless, and the wings appear to be in different conditions of degeneration, though in most of the species they are fully developed. It is not quite certain whether winged and flightless forms may not occur even in the same species in one instance.

In the Elateridae of the subfamily Eucneminae, an uncertain number of the species of *Dromaeolus* are flightless, while many of the genus are fully winged and are occasionally taken in the act of flying. Of the true Elateridae Dr Sharp believes that one form, *Dacnitus currax*, is flightless. It is allied to the endemic genus *Itodacnus*, which flies freely.

The single Lucanid genus *Apterocyclus*, somewhat allied to *Dorcus*, is flightless and endemic.

The Nitidulidae are mostly fully winged, but four genera, containing in all nine species, are flightless, while the remaining 129 species in nine genera are fully endowed with flight. The amount of degradation of the wings in the flightless forms varies according to the genus or species.

The endemic Histeridae of the genus *Acritus* have flightless species, but these are probably much less numerous than the fully-winged ones.

In the Staphylinidae some of the species of *Myllaena* are apterous, their congeners being fully winged.

Of the endemic Carabidae 184 are flightless, the fully-winged species only 20. Nearly all the flightless endemic insects are inhabitants of the forest, or if they frequent exposed situations like some of the Carabidae, they are closely related to species that frequent thick forests and are equally flightless. There is no ground for supposing that in these islands, as has been suggested for flightless insects inhabiting other Oceanic islands, the wings have been lost or degenerated through the agency of natural selection, as being a source of danger, if used on small land areas, where flying insects are supposed to be liable to destruction from being blown out to sea. Only in the case of the moth, *Hodegia apatela*, could this theory be applied by any stress of imagination. So far, *Hodegia* is at present only known from open and wind-swept localities, and it inhabits these both above and below the forest region. Practically it is a flightless species of *Thyrcopa*, and fully-winged examples of this genus have been observed to flourish in the most wind-swept of all regions close to the sea margin. Still more delicate Microlepidoptera are found in similar open country, and many of these as well as the fully-winged species of *Thyrcopa* seem to be far more successful than the *Hodegia*.

All the cases of flightlessness in Hawaiian insects are, I believe, to be explained simply by 'disuse.'

If we consider the case of the endemic Heteropterous bugs, we find that all the flightless forms are either entirely or to a great extent of terrestrial habits. The winged species of *Metrarga* though they may descend to the ground, yet habitually breed on certain plants, often at a height from the ground, but the terrestrial *M. villosa* is flightless. All the truly arboreal Reduvioli are winged and are sometimes seen on the wing. Some may overlap with the flightless forms in their habitat, but on the whole the two groups are quite distinct. The apterous Emesiidae are also terrestrial. The Elaterid, *Dacnitus*, is terrestrial, as is the Lucanid, *Apterocyclus*. Many of the flightless insects are conspicuous for their sluggishness, e.g. the subapterous Nitidulidae, and amongst these we find the only terrestrial species of this family. Many of the Carabidae that are flightless are arboreal in their habits, but these are all able to run quickly, and many of them are extraordinarily active. It must be remembered that in creatures inhabiting a dense forest belt, as most Hawaiian insects do, many of these, when in search of new feeding grounds, at most require to descend from one tree and ascend another. Predaceous creatures like Carabidae and many of the feeders on dead wood, as we have often observed, infest the same tree year after year, and probably only cease to do so as the tree itself fails to afford suitable food for the creatures that it supports, both those that feed on its substance and those which prey on these. Doubtless with very sluggish, flightless beetles the death of a tree often entails the death of numerous individuals, but during its occupation by generation after generation, individuals may become dispersed and colonize adjoining trees. In the case of more active forms like the Carabidae, the death of a tree, that is their home, need cause no loss of life of the beetles. It is instructive to note that in the case of beetles, which require for their food that a tree should be in a special state of disease or decay, lasting only for a short period, e.g. the bark-eating Longicorn beetles, and the burrowing Scolytidae, no case of loss of flight is known to occur. That many creatures, which find an inexhaustible food supply within a very small area, should become more and more sluggish or loth to fly, and finally by disuse lose their powers of flight, seems quite natural. Natural selection may have prevented the loss of flight organs in some of the island creatures, but it has probably had nothing to do with the degeneration of the wings in the flightless ones. Had any of the Plagithmysine Longicorns or the Passerine birds taken to a terrestrial life, we should probably find flightless examples of these, as we do in the Nitidulid beetles and in the (now extinct) small rails of the genus *Pennula*. On the other hand sluggish Nitidulid beetles that affect flowers are never flightless for obvious reasons.

Except in one or two isolated and doubtful cases (*Cis* and *Bembidium*) there are no instances known in the endemic Coleoptera or Heteropterous bugs, where a species has both fully-winged and flightless individuals. In fact the only case known where, apart from the condition of the wings, individual beetles are apparently inseparable, is that of *Bembidium molokaiense* (winged) and *Nesocidium laeticulum* (flightless). In the Homopterous bugs, however, we have fully-winged and flightless forms of some species, e.g. of *Aloha ipomoeae* and *Nesosydne ipomoeicola*, of which fully-winged forms are only produced at times and are then less numerous than the brachypterous. These species both occur outside the forest. Of those found only in the forest on ferns or trees I know no such cases of dimorphism, so, if any exist, they must be rare. Many species are only known as fully-winged forms, e.g. the several species of *Aloha* that feed on the Myrtaceous tree *Metrosiderus*. Most of the species of the extensive genus *Nesosydne* are flightless, but *N. koae* appears to be always fully winged. This latter, though it feeds on a common and gregarious tree (*Acacia koa*), yet appears to have peculiar habits, so that few Koa trees, as a rule, are in a condition to support it, since they bear no true leaves. Whether this fact concerns the retention of the organs of flight is worthy of investigation. In fact a careful study of the winged and wingless forest-frequenting species of *Nesosydne* would be of considerable interest.

Probable origin of the existing fauna from very few immigrants, the large genera, or group of allied genera originating from a single or few ancient immigrants. Comparison with the Flora.

When we look at the Hawaiian fauna as a whole we cannot help remarking the numerous genera, which comprise an inordinate number of species. Also, we note that a tribe or subdivision of a family will be represented by a number of closely allied genera, these together including many species. Or, as in the Drepanidid birds, a family may contain many closely allied genera, though these have but few species. A few characteristic examples may be cited. In insects, of the Lepidoptera, *Scotorythra* (Selidosemidae) has more than thirty species; *Scoparia* (Pyraustidae) about 60; *Thyrcopa* (Gelechiidae) about 30; *Aphthonetus* and *Neelysia* (Hyponomeutidae) each about as many as the preceding, and *Hyposmochoma* of the same family about 180; *Heterocrossa* (Carposinidae) contains more than 30 species. Of many of these, species still undescribed are also known. In Coleoptera, *Oodemas* (Cossonidae) has 46 species; *Proterhinus* (Proterhinidae) no less than 136; while the Cerambycid genus *Plagithmysus* has 33; *Xyletobius* and *Mirosternus* (Anobiidae) have 52 and 70 species. In the Odonata or dragonflies, *Agrion* has two dozen species, and the Neuropterous *Anomalochrysa* (Hemerobiidae) thirty. The genera *Nysius* and *Reduviolus* in Hemiptera, together with about 50 species, form nearly 40 per cent. of the endemic Heteroptera, while the Homopterous *Nesophrosyne* has a multitude of forms, 42 having been described. In Hymenoptera, *Odynerus* (Eumenidae) has nearly 100 species, and *Nesoprosopis* (Prosopidae) more than 50.

The Molluscan genus *Achatinella* contains 107 species, as enumerated by Sykes, *Amastra* 101, and *Leptachatina* 75. Even allowing that many of the described species may prove to be only varieties of others, the genera are of very large extent.

With regard to series of genera that are closely allied to one another, it will be noticed that many of the genera already named as containing a great number of species, have themselves given rise to offshoots of generic value, i.e. have produced species judged to be more different from the aggregate of species they contain, than are these one from another. In the Carabidae, the Anchomenini contain 17 genera more or less closely allied to one another, and the Pterostichini four, the latter tribe with 76 species, the former with 106. The Plagithmysini of the Cerambycidae contain three closely allied genera, and the Prognathogrylline crickets (Gryllidae) four.

It becomes of importance to consider whether these great series of congeneric species and smaller series of allied genera have been developed in the islands from a single anciently immigrant ancestor in each case, or have sprung from diverse ancient immigrations. Are we to consider that Drepanid birds, Anchomenine beetles, moths of the genus *Hyposmochoma* and *Scotorythra*, etc. etc., have more or less frequently safely reached the islands in past times and become established? If this be the case the successful immigration of outside animals must have been of comparatively common occurrence. If we are able to say in any instance that in the case of one of these series, whether of genera or species, that one species or genus is more closely allied to some foreign form while another is more closely allied to a second foreign form, than are the Hawaiian species or genera to one another, we should naturally suppose these to be of different origin. Thus the moths of the genus *Margaronia* are very different, and clearly belong to quite different groups existing outside the islands, and cannot be supposed to have developed within these from a common immigrant ancestor. One in fact (*M. exaula*) differs very slightly from foreign species, and the fact that its caterpillars are sometimes found feeding on imported shrubs growing in gardens in Honolulu renders the endemicity of the species very doubtful. It is probably an importation by man and will be found elsewhere.

In a few cases, however, we can, from a study of the structures of the truly native insects and a comparison with outside forms, be sure that the existing species are not sprung from a single ancient immigrant species. This is the case with the great series of Hawaiian wasps of the genus *Odynerus*, one group of which (*O. nigripennis* and its allies) is closely related to Oriental species, and entirely different from the other members of the genus. I suspect that the endemic moths of the genus *Agrotis* are similarly of diverse origin. If we consider the habits and distribution of these genera, that both are dominant forms, almost cosmopolitan, that in almost every country species of each of them are excessively numerous in individuals, we shall not be surprised that individuals of more than one species of each have at different times reached the islands. Moreover, it should be said that neither *Odynerus* nor *Agrotis* (s.l.) are the equivalents of ordinary genera, but comprise a heterogeneous mass of forms, which either remain unclassified or at least are imperfectly understood as to their relationships.

Many of the genera that contain a very long series of endemic species are themselves peculiar to the islands, many in fact are so highly endemic that their relationship to outside forms is by no means close, or even so remote as to be involved in doubt. The time that has been necessary for the isolation of such remarkable genera may well be considered sufficient for the production of the long series of allied species that they contain, without the supposition of several or numerous immigrant species. In compact, smaller groups like the longicorn beetles of the tribe Plagithmysini, the probability of the origin of the Hawaiian series from a single form is, I think, not likely to be disputed by those who have studied the creatures. There are three genera, and the differences between the extreme species is great. Supposing the existing species to have arisen from diverse immigrant species, it would be natural to suppose that one immigrant at least represented each of the three genera. When, however, we look into the differences between these genera, we find that though the bulk of the species are easily enough placed, each in its proper genus, yet some species, forming distinct connecting links between the genera, are still existing. Thus of *Plagithmysus immundus* Dr Sharp remarks: "It is a connecting link between *Clytarlus* and *Plagithmysus*," while *Callithmysus cristatus*, once referred to *Plagithmysus*, shows evident relationship to some species of the latter and also to *Clytarlus.*

It is when we come to examine the more complex groups of allied genera such as occur in the Carabidae or the Drepanid birds, that there is greater room for diversity of opinion as to the multiple or single origin of the Hawaiian forms, as they exist at present. As to the Drepanididae, their case has already been considered in the part of this work dealing specially with the birds. It is of some importance on account of the fact that these birds may by some botanists, who consider the flora to have largely been established through the agency of these creatures, be considered responsible for the introduction of a not inconsiderable portion of the existing plants. If, however, the existing forms have all sprung from a single or dual chance immigration in long past ages, the part that this dominant group of land-birds can have played in the establishment of a flora will be necessarily very small, or possibly of no account at all.

It may be worth while to consider some points in connection with the two important and quite distinct groups of endemic Carabidae, the Anchomenini and Pterostichini. The 17 genera of the former group have been divided by Dr Sharp into two divisions, one with ten, the other containing seven genera. The character separating these divisions is derived from the structure of the tarsi, which in the one case have a peculiar grooved structure, while in the other they are simple. Amongst the genera with grooved tarsi, however, there exist species in which the sculpture is very much reduced or indistinct, and in the genus *Colpocaccus*, some of the species have the grooves much more developed than others. In *Metromenus*, one of the species (*M. politus*) not only has the grooving of the tarsi very obscure, although it belongs to a genus in which this sculpture is comparatively strongly developed generally, but in other respects it bears considerable resemblance to members of the division with unsculptured tarsi. The characters on which the individual genera are separated in these two divisions of Hawaiian Anchomenini are chiefly (1) the condition of the wings, whether rudimentary or well-developed, (2) the absence or presence of sensory setae on the pronotum. In wing-development and in the setae the Hawaiian series are, as a whole, remarkably deficient as compared with foreign forms. Three of the 10 genera in the division characterized by simple tarsi are fully winged and can fly, six have the wings quite rudimentary, but in one of these, *Barypristus*, the one species (*incendiarius*) has wings about twice the size of the other (*rupicola*), while one genus, *Chalcomenus*, has large wings, only the apical portion being somewhat reduced. It is, however, flightless, and no doubt represents an early stage in wing-degeneration. In the other division one only (*Colpocaccus*) of the seven genera possesses functional wings, the others having these organs quite rudimentary. The prothoracic chaetotaxy appears to be in a more unstable condition than was supposed to be the case at the time this character was utilized for generic distinction. Thus *Barypristus incendiarius* is now known quite commonly to be devoid of any pronotal setae, or to have a seta developed on one side only. *Apteromesus maculatus* has sometimes a seta near the hind angles of the pronotum. *Mesothriscus vagans* rarely develops a weak seta at the posterior angles, so that certain examples might on this character be placed with the Hawaiian *Platynus*. One example of a small batch of the very distinct *Metromenus fossipennis* was found to bear a well-developed seta on each side-margin of the pronotum near the middle, so as to become a *Mesothriscus*. It is now known from the examination of individuals taken in company, that some of the Pterostichine species also vary in the setae, so that individuals of one would on this character be placed in two genera. Apart from the variability in the chaetotaxy, it certainly appears to me that the use of this character for generic separation tends to place in different genera species[1] that are really closely allied. Excepting the *Barypristus* mentioned above and a few of the Pterostichine Carabidae, it is proper to state that variation from the normal number of setae is rare and exceptional.

The occurrence of endemic Hawaiian species referred to a foreign genus, *Platynus*, needs special notice. The two known species of this genus (apart from chaetotaxy) are not closely allied to one another, but each much more closely resembles species placed in other Hawaiian genera. If they truly belong to *Platynus*, then it would be necessary, if we maintain the view that the Hawaiian Anchomenini have been derived from a single immigrant form, either to consider this genus (since it is the only one known outside the islands) as having given rise to the other endemic forms, or to suppose that *Platynus* has arisen independently in the Hawaiian group. The Hawaiian *Platynus* is not central in the series of Hawaiian genera, this position being held by such forms as *Colpocaccus* and *Mysticomenus*, both of which it may be noted are fully-winged forms. It should have been noted above that these fully-winged forms are very poor performers on the wing. I think it probable that the Hawaiian Platyni will ultimately be found to be more closely allied to other of the endemic Anchomenini, than to foreign Platynus, and will be separated from the latter.

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[1] Some of these species are not only extremely similar in structure apart from the chaetotaxy, but have peculiar and identical habits.

It must be confessed that the extreme forms of Hawaiian Anchomenini are very unlike one another, yet no single genus (as in the case of the birds of the family Drepanididae) appears to be very isolated from its nearest ally. Probably each is more nearly related to its neighbour than to any outside form, and this seems to me in favour of the whole series having been evolved from a single form, anciently immigrant. In any case the possibility of the series having originated from numerous Anchomenine immigrants at various periods of time, each of these immigrants having been such as to fit naturally into the existing series, or at least having given origin to forms that do so fit in, seems very improbable. Should one even propose two ancestral immigrant forms, one most like *Colpocaccus* or *Mysticomenus* (central in the existing series), a fully-winged insect giving rise to the series of genera with simple tarsi, and now mostly flightless, the other perhaps flightless and akin to *Platynus*, giving origin to the series with grooved tarsi and at the same time all flightless, the great resemblance between *Colpocaccus* and *Mysticomenus*, the one with grooved, the other with simple tarsi, and the specific differences in the development of the grooves of the former, may cause him to hesitate to admit even a dual origin for the whole series.

The case of the Hawaiian Pterostichini is much simpler than that of the Anchomenini. There are only four genera, intimately allied, and separated solely by the characters of the pronotal setae. Several of the species are now known to be almost certainly inconstant in these characters, since individuals, not otherwise different, have been found in company (in a 'batch') both with and without certain of these setae. Consequently individuals of one species fall into two genera on the pronotal chaetotaxy. As in the Anchomenini, there is a great diversity of appearance in the members of this group, and here again the setal characters appear to sunder species that are really allied. The large series of existing species do not seem to have required more than a single immigrant species for their evolution. The less diversity of structure as compared with the Anchomenini, I judge to be due merely to the fact that sufficient time has not elapsed for its production. Whereas the Anchomenine Carabidae are now spread over all the islands, the Pterostichines, whose head-quarters are clearly on the central islands (Maui and Molokai) where probably they first became established, are at present not known at all on Kauai (admirably adapted as is that island for their occupation), and even on Oahu are sparsely represented by a few more or less commonplace forms. Looking at the most remarkable of the existing Pterostichines in the islands, it does not require a great stretch of the imagination to see in these the progenitors of future genera as distinct from the more commonplace forms, as are the more remarkable Anchomenini, the genus *Blackburnia*, for example, from the more commonplace Anchomenines. The Hawaiian Pterostichines, speaking generally, are in a wide sense hardly more than flightless forms of *Cyclothorax*, a genus of a few species in the Australian region, a fact in itself opposed to the probability of their having arisen from various immigrant species.

A comparative study of many groups of animals represented in the islands, and of the affinities of species to species, and genus to genus, in the groups of allied forms, has led me to believe in the extreme rarity of a successful immigration from outside. The extraordinary gaps in the fauna of whole families of wide distribution and containing countless species, many of which no doubt would, and some of which, after introduction by man, are known to thrive in the islands, show clearly how hardly and rarely have immigrants reached them from without. A limited number of birds and insects, species of well-known migratory habits, for which no seas are impassable, doubtless, arrive continually, but these, only in the event of such migration ceasing, are likely to produce new and endemic forms.

The phenomena exhibited by the Flora, appear to me to be extremely similar to those of the Fauna. There may be seen the same notable absences of forms widely distributed elsewhere, the same multiplication of allied species of many of the genera that are present, the same groups of allied genera embracing many species. I believe that the explanation of these facts is quite in accordance with that which I think to be true of the Fauna, as above stated. Dr H. B. Guppy, who has paid much attention to the flora of the Pacific islands and the dispersal of plants, as I understand his book, takes a different view of these allied genera and species, and would consider them the result of numerous immigrants.

He considers that there existed an ancient age of Conifers in the Pacific, thereby accounting for the three genera *Dammara*, *Dacrydium* and *Podocarpus* in the Western islands. These three genera are entirely absent from Tahiti and the neighbouring islands, and from the Hawaiian group, the explanation being that at the time these conifers reached the islands of the Western Pacific, the Hawaiian and Society groups did not exist. Later, he tells us, there was an age of Compositae and arborescent Lobeliaceae, during which nine endemic genera of the former reached the Hawaiian group, and one other (Fitchia) became established in Tahiti. There is no trace of this era of Compositae in the Western groups (Fiji, Samoa) owing to the submergence of the Western islands during Tertiary times, the supposition being that during the time, when Hawaii and Tahiti were receiving their Compositae from America, the Western islands existed above water at most as small islets formed by their highest mountain peaks.

Two of the coniferous plants are said to possess seeds that could be carried across wide oceans by the aid of birds, even to the Hawaiian group, and yet during the whole period between the time when the Hawaiian group and Tahiti came into existence, and the present, it does not appear that these have even reached the Samoan group, so comparatively near to Fiji. One would rather suppose that the presence of the conifers in Fiji, like its Cicindelid beetles and some other animals, is due to the continental character of the group.

As to the era of Compositae in the Pacific, the presence of these in the Hawaiian islands and their absence from the western groups does not seem to require the geological explanation above mentioned. The fact of a few species of Compositae having reached Hawaii in early times would account for what we now see. The Hawaiian Compositae are admittedly of American origin and it is natural that the Hawaiian group and Tahiti, being nearest to the American continent, should have received thence immigrants which much more distant groups of islands have not received. Nor need we suppose that there has been any 'suspension' of the means of dispersal of Compositae to Hawaii since, subsequent to the first few earliest immigrants, it must have received the progenitors of *Tetramalopium*, *Lipochaeta* and *Campylotheca*, and probably much later still, *Artemisia*.

Of the age of arborescent Lobelias and their absence from the western groups, the explanation is similar to that given to account for the Compositae. They also are said to be of American origin, and the island groups in which they occur are just those which are nearest to the American continent. We may note that the Galapagos Islands, less distant from the South American coast, also have their own endemic Compositae. Birds which are supposed to have been efficient in stocking the islands with plants, still annually migrate in numbers (of many species) from the American coast.

It may be advisable to consider further and in some detail the endemic Hawaiian Compositae and Lobeliaceae, it being interesting to compare the facts in connection with them with those that concern various elements of the fauna. It should be understood that the Hawaiian Compositae as a whole (endemic and foreign) are to be compared, not with a compact tribe such as the Anchomenine Carabidae, above mentioned, but rather with the Hawaiian Carabidae as a whole.

The four genera *Remya*, *Wilkesia*, *Argyroxiphium* and *Hesperomannia* are supposed by botanists to be extremely ancient forms in the flora, and, on account of their having only two[1] species each, to be in a decadent stage and becoming extinct. Their antiquity as elements of the Hawaiian flora is, I suppose, mainly based on their structural isolation, as compared with foreign forms, but it is said to be also shown by the paucity of the existing species and their restricted range in the islands. Although a limited number of species in an endemic genus is sometimes found, where we suspect that genus to be an ancient component of the flora or fauna, yet more often the oldest elements of the flora are certainly those genera (or groups of allied genera) with the most numerous species and the widest distribution, as is also the case in the fauna. Therefore the primary consideration must be the structural peculiarity of the plants themselves. But we must not altogether overlook the possibility of the discovery of forms in America, more closely allied to these isolated Hawaiian species than those yet known. Besides these supposedly ancient genera, we have *Raillardia* and *Dubantia*, together comprising about a score of species, the genera being related to one another and also allied to the genus *Raillardella* of the Sierra Nevada. Consequently these genera and their species may well be supposed to have originated from an anciently introduced form, allied to *Raillardella*, if not actually of that genus. These Composites are common and generally distributed, though *Dubantia* apparently is not known on Hawaii, except from the most ancient part of that island, that part in fact which originally formed the whole island.

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[1] According to Hillebrand's Flora of the Hawaiian Islands.

Next come the three genera *Tetramalopium*, *Lipochaeta* and *Campylotheca* only "on the borderland of generic distinctness," the two former reputed to have species existing in California and Mexico, and the latter practically equivalent to *Coreopsis*. Finally we have *Artemisia* with two endemic species, each occupying a very different station.

The era of arborescent Lobelias is supposed to exhibit much the same phenomena as the Compositae. Dr Guppy says that some are in their prime, others on the point of extinction, and that the distribution of genera and species within the islands shows that the original immigrants were not contemporaneous. They are only found in the Eastern Pacific Islands, chiefly in Hawaii, with a few species in Eastern Polynesia. They are absent from the Western Pacific Islands for the same reasons, it is said, as are the Compositae.

However, on an examination of the Hawaiian endemic Lobelias, we find that there are five genera, all well represented with from half-a-dozen to about thirty described species, excepting the monotypic *Brighamia*, of peculiar habits and occupying stations impossible for most of the others to thrive or even exist in. But there is this great difference between the endemic Hawaiian Composites and the tree-lobelias; of the latter the genera are not only *all* endemic, but they are remarkably peculiar, so much so that Hillebrand did not even hint at their affinities. The seven endemic genera of Hawaii and Tahiti are placed by Engler "in a group by themselves"... "and he does not approve of the endeavours of some botanists to isolate one of them from the rest and to connect it (*Brighamia*) with the Australian *Isotoma*" (Guppy).

Now it seems much more natural to suppose that these allied genera of Hawaiian Lobelias have been developed in the islands from some very anciently immigrant species, than that all the genera (or their ancestors) were originally produced elsewhere and have all become extinct in their original homes. Or if they have become in the islands so greatly modified that their American ancestors can no longer be recognized, the time sufficient to produce such modification would have been also ample to have allowed the development of the large number of species (many being still undescribed) and of most of the genera, even from a single anciently introduced form. One may judge of the near relationship of these Hawaiian genera, when one studies the synonymy of the species and notes how competent systematic botanists have constantly referred identical species to different genera!

While the endemic Compositae may aptly be compared with the endemic Carabidae in the beetles, the Lobeliaceae are comparable rather with the Prognathogrylline crickets, though the evolution of species in the latter has been much less profuse.

Although endemicity of plant or insect, as represented by great peculiarity of structure and usually by the occurrence of numbers of allied species, naturally indicates a very ancient occupation of the islands by their immigrant ancestors, yet it does not necessarily follow that paucity of species or the apodemicity of a genus denotes a comparatively recent immigration. A classification of the Flora, as belonging to a definite age or era, based on such a supposition will certainly prove erroneous. It is not probable that all immigrants, that arrive and become established, are able, even after vast time, to become adapted to such diverse conditions as others, and some, doubtless, are much more slow to do so than others. The evolution of new genera or species would proceed in a very different manner in different cases. In judging the length of time that any particular plant or group of allied plants has existed in the islands, the botanist would be well advised to consider the fauna that is specially attached to these. When one considers that trees little modified from foreign species, e.g. *Acacia koa* or *Sophora chrysophylla*, possess a great endemic fauna, not only species, but even genera of birds and insects, quite restricted to or dependent on them, and that some of these creatures are certainly themselves not less remarkable in their peculiarities than the most peculiar of the Composites or Lobelias, we may hesitate to attribute such plants to a later era than many other elements of the flora, which at first sight appear far more ancient. Again, while in the islands an abundant endemic fauna restricted to a plant indicates an ancient occupation by the latter, the absence of such a fauna does not necessarily imply the reverse. In a fauna of comparatively few types it may happen that few or no species have reached the islands that could become adapted to certain elements of the flora even after great length of time. I think that those who are in favour of the comparatively frequent accession of immigrants to account for the great series of allied species, or groups of allied genera, hardly make full allowance for the great age of the islands. Hitchcock remarks in writing of the most recent portion of the group, the still active Mauna Loa on Hawaii, "when one considers how little the bulk of the mountain is made up of the few flows delineated on the map, and how small a portion of the whole mass these can be, he is overwhelmed by the certainty that there were millions of streams and that millions of years must be assumed in order to say how old the mountain is. It must have commenced to build up long before the tertiary period." And here he is considering the most recent portion of the group and not the vastly more ancient parts.

For my part, as I understand it, the present Hawaiian fauna is derived from waifs and strays from all directions. At rare intervals from the Eocene till now chance immigrants have arrived. Some have been able to establish themselves, many more probably, even after a landing has been effected, have failed. Those that have been successful and have found congenial conditions have often thriven amazingly, giving rise to hosts of descendant species, as they have become adapted to, or become modified by, diverse conditions. There has been no 'age of Conifers' any more than an age of Cicindelidae (of which also a few are found in Fiji), no age of Composites or tree-lobelias any more than an age of Drepanididae (birds) or Plagithmysides (beetles). Where conditions have proved favourable and remained so, and plant or animal has become adapted to special conditions, an exuberance of distinct forms has sprung from the ancient immigrant. Such cases are manifest in the Lobeliaceae amongst plants, and in many groups of animals, the Drepanididae (birds), Plagithmysidae (insects), Achatinellidae (mollusca) and many others. Such form the chief and most interesting part of the native fauna and flora of the present day.

Species-formation in the Hawaiian animals.

As evidenced by the long series of closely allied endemic species of many kinds of animals, it is clear that species-formation has been very active within the limited area of the islands and there is no reason to doubt that this activity still continues. Some insight into the possible modes by which this multiplication of species has taken place may be gained by a consideration of the existing fauna. But what is now needed is not so much general, or even special collecting of existing forms, as years of experimental work in breeding a well-selected series of animals in the field. Unfortunately this cannot be done by residents in the settlements on the coast, but needs a prolonged and continuous residence in the mountain forests. In few cases can the mountain creatures be acclimatized to breed successfully in the lowlands, and it would be folly to embark on a laborious series of experiments, destined to fail, as soon as results were becoming interesting, if not sooner.

Geographical segregation we may judge to have been a most important factor in the evolution of species within the islands. It is obvious that the magnitude of the total number of species of animals is to a large extent due to the fact that, instead of one continuous land area, there are six forest-clad islands, and that in many very large genera very few identical species are found on more than one, and many others in only two or three of these islands. Thus the bird genus *Oreomyza* (Pls. XIII and XIV) has a distinct species on each island. These birds have mostly very similar habits and feed on similar food, in fact it is known that on some of the different islands a good deal of this food consists actually of the very same species of insects. Having a very varied dietary on each island, we may consider that the food of each species is practically the same. Moreover, as some of the species thrive in different areas, each on its own particular island, these areas having quite different climates, vegetation, rainfall etc., it is clear that it is not these conditions that necessarily affect the species. This is a very important point to remember in considering the effects of isolation.

Again and again in insects we find a species inhabiting one island replaced on several of the others by closely allied forms, so that we can feel sure these have been derived one from another or at least from forms hardly different from either (Pl. XVI, figs. 8, 9 and 10). It might be supposed that the small distance between the islands would not be sufficient for isolation, especially when we consider that the animals, from which all the fauna is derived, must necessarily have traversed the vast distances between the islands and other lands. This, however, is clearly not the case. Certain species, of migratory instinct, amongst the birds visit the islands regularly, but do not settle down and give rise to endemic forms, and the insects of known migratory habits, like the butterflies *Pyrameis cardui* and *Anosia erippus*, the foreign species of *Plusia*, *Sphinx convolvuli*, *Nomophila noctuella*, the large American dragonflies etc. we may well suppose receive recruits sufficiently frequently from other lands to prevent any true isolation. It is what we may fairly call the 'chance' immigrant that is the potential producer of new species. It seems incredible that so strong-winged a butterfly as *Pyrameis atalanta*, which has been established on the island of Hawaii for over twenty years[1], was, at least until a few years ago, certainly restricted to that island, and has not even yet been recorded from any other. As is well known, this same butterfly is supposed to be a constant migrant from the European continent to England across a channel comparable with that between Hawaii and its next neighbouring island.

If we consider the endemic species, and examine the 'Cyclothorax' group of Carabid beetles (presumably derived from the Australian region) we find they are very richly represented on the neighbouring islands of Maui and Molokai, central in the group, relatively poorly on Hawaii, with its comparatively great area and varied conditions, much more poorly still on Oahu, and, so far as is known, totally absent from Kauai, the extreme island to the north-west. Though the 'Cyclothorax' beetles have existed a sufficient time in the islands to become so enormously rich in species and to occupy the most diverse situations, where they occur, yet they have clearly been very slow to spread from island to island. The fan-tailed flycatchers (*Chasiempis*) derived also from the Australian region, are totally absent from the three intermediate islands, showing well the chance character of the interisland immigration, in the case of birds, whose ancestors also must have traversed thousands of miles of sea to reach the Hawaiian group. In the Drepanididae, *Heterorhynchus* is unrepresented on Molokai and Lanai, *Hemignathus* on Maui and Molokai, and *Drepanis* (incl. Drepanorhamphus) on Oahu and Kauai. Yet such forms must have required enormous time for their evolution. In none of these cases can the nature of the islands, from which the various animals above mentioned are absent, be for a minute considered as the cause of their absence. In the endemic birds I have elsewhere noticed that there are two elements, one consisting of a few wide-ranging species, widely spread throughout the group (e.g. *Himatione vestiaria* and *Psittacirostra*

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[1] Though abundant on Hawaii, in districts visited by him, this butterfly was not found by Mr Blackburn some 30 years ago, so I suppose it reached the island subsequent to his visit there.

psittacea) and a second containing forms restricted to one, or very rarely found on two adjoining islands. This latter group comprises most of the endemic Passerine birds. Even the native crow and buzzard, birds of very great powers of flight, do not occur except on the island of Hawaii.

In insects one notices the same phenomena. In this group, speaking generally, the more widespread forms are usually endowed with powers of flight. Even in the Carabidae, where the vast majority of the species are known only from one island, it is mostly the winged forms that one finds on more than one island, either unmodified, or with species hardly different from one another (cf. *Bembidium teres*, *pacificum* and *molokaiense*, the species of *Colpocaccus*, *Colpodiscus lucipetens*). The winged species of minute beetles of the genus *Cis* are many of them of very wide distribution, so are many of the Lepidoptera. Flightless species are rarely widely distributed. Those species of the Cossonid genus of beetles, *Dryophthorus*, that live in logs, and are extremely tenacious of life, however, are often of wide range. But, as in the birds, hosts of insects with admirable powers of flight are quite confined to one island. The Achatinelline shells, so richly represented on Oahu, Maui, Molokai and Lanai are very poorly represented on Hawaii, and are nearly unrepresented on Kauai, where the great genus *Achatinella* is altogether wanting.

These facts seem to me to show clearly that, with certain exceptions, it must be very rarely that a species passes from island to island so as to become established, and that when this does happen, the immigrant is likely to be isolated for a very long time.

Since in many insects amply endowed with powers of flight, and in the majority of flightless species, there are closely allied but distinct forms in different islands, one may consider that stray examples of a species have only to become separated from the mass of individuals of that species and kept isolated, in order to become in time so modified as to form new species. Where we find an endemic species spread over each or several of the islands, we may suppose either that in such cases the species in question, owing to powers and range of flight, or to other special facilities for distribution, is carried from island to island sufficiently often to prevent isolation, or that, if isolated, sufficient time for change has not yet elapsed. I have elsewhere referred to the fact that there is good evidence to believe that owing to the stability of species, even a great change of environment and isolation cannot be supposed as a rule to affect a species after a few or even a considerable number of generations. That isolation is a most important fact is evident from comparison of the fauna of the several islands. In the Hawaiian group it may be roughly said that isolation is directly proportional to the distance between these islands. If we consider a large, well-collected and much studied genus, such as that of the wasps (*Odynerus*) we find that the comparatively approximated islands of Lanai, Maui and Molokai have many species in common, while Hawaii has few such species, Oahu still fewer, and Kauai, the most remote island, none at all.

We may see forms on the different islands in various stages of becoming distinct species, from the earliest stage, where merely the range of variation of a species is different on two islands, to that where every individual is different, but the differences are so slight as to be hardly specific, and finally to that where the separating characters are too important to be considered racial or varietal, when we may feel fairly confident, that even should a fresh immigration of the original species take place from the one island to the other, interbreeding would not follow.

Modifications following change of environment or isolation are of course subject to the action of natural selection, which may expedite the formation or mould the character of specific distinctions, but even without any selection the original species will be changed if isolated and isolated long enough. It is not improbable that the plastic condition of the species in so many genera, and the extreme difficulty that exists in limiting the species, is really due to the slackness or absence of the agencies, by which natural selection works, the struggle for existence in the case of many of the island creatures having been much less severe than in a more populous and varied fauna.

One might cite any number of cases to show the effects of geographical isolation on specific characters in insects, but one or two simple ones are sufficient. The little bee *Nesoprosopis anthracina* occurs on all the islands from Oahu to Hawaii. It is a xerophilous species, frequenting the flowers of *Sida*, *Vitex*, *Waltheria*, *Tribulus* etc. as well as plants introduced by man. On Kauai only it does not occur, but is there replaced by *N. flavifrons*, very closely allied to it, but quite distinct, with the same xerophilous habits, and frequenting the same food-plants. Another species, *N. facilis*, also found on all the islands but Kauai, is there replaced by an extremely closely allied form *N. chlorosticta* with similar habits. This case differs from the preceding in that both these bees on their respective islands are wide-ranging, and able to thrive in localities very diverse in climate and conditions. They range from the coast to a height of fully 4000 ft. in mountain forests, and yet do not exhibit notable variation under these diverse conditions.

In cases where flightless and sluggish insects are found widely spread throughout the islands, when one would naturally expect modification of specific characters to have taken place on different islands, a careful study of life and habits will probably generally show reasons for the suspicion that isolation is not complete. For instance we are surprised to find a small, flightless and sluggish beetle like *Proterhinus deceptor* on all the islands, little or not at all changed, but we search in vain for distinctions between individuals taken on the various islands. Some variation there may be, but this is no greater between examples from different islands than between others taken on one island. In 1900, and subsequently, I paid some special attention to this case. It was found that this small beetle breeds in profusion in dry regions below any existing forest, in scattered trees, though it also occurs at high elevations in the mountains and under very diverse conditions. It is clearly only restricted from reaching the coast by the presence of introduced predaceous insects, which quickly exterminate it, and doubtless it did once frequent the coastal region. It is one of the few beetles found in the dry branches or stems of those trees, which form a large part of the island driftwood, and being able to adapt itself to very varied conditions of climate etc. and also breeding freely in those trees, which extend right down to the coast, it must have had unusual opportunities for being carried across the interisland channels and also for becoming established when so transported. It even breeds abundantly in the dry, woody capsules of some xerophilous trees. I should consider in this case that the interisland channels have not been sufficient to isolate examples, that may have reached the different islands. Though flightless, we may class such a species with the vagrant birds, *Himatione*, *Psittacirostra* etc. elsewhere alluded to.

It is interesting to observe in animals in which secondary sexual characters of the male are conspicuous, that when geographical isolation has taken place, these are generally modified, in fact herein may apparently be the only modification, as if these sexual characters were often the first to become changed.

It should be noted that specific change may be concurrent with isolation alone, without any change of food or habits, so far as can be observed, though, of course, whether there is really a change of habits is uncertain.

Quite apart from these cases, where isolation on separate islands has induced specific change, we must consider the cases where extremely closely allied species derivatives one from the other, or both from a form hardly different from either, exist on the same island. Of these there are two classes, one in which the closely allied species inhabit only different areas, and the other in which they occupy the same area. In the first case the species are on the same footing as if they inhabited different islands. The best illustration of these is shown by the land Mollusca, of which it is often said that each valley on Oahu has its own peculiar species. It is true that many of the valleys do apparently have their own species, or at least local races, which do not pass beyond, but there are numerous species that have a much more extensive range, either occupying several valleys or ridges, or even having a still wider distribution. It is not accurately known how the *Achatinella* are distributed, but it is quite clear that they can only pass from island to island by a most rare and exceptional chance. This is shown by their poor representation on Hawaii and Kauai, and the fact that of the arboreal species on such islands as Oahu, Molokai and Maui (where they are well represented) there is on each island a specific multiplication of only a few type forms, showing that the present numerous species on a particular island are the produce of only a few earlier established forms. The 'Apex' group of *Achatinella* is peculiar to Oahu, and so with other groups. The sluggishness of the animals would probably make any wide distribution of the

Achatinella on any one island a matter of a very prolonged period were this dependent on their own movements. We once found at the foot of the Waianae slopes a number of one of the terrestrial species of *Amastra*, quite outside the forest, hiding in the hollows of a large log on the bank of a stream. This log had clearly been carried down in a flood, and probably for many miles before stranding, the stream arising in the Koolau range of mountains, the forest of which was miles distant. Once, on Molokai, a young living *Achatinella* was found attached to the feathers of the Drepanid bird *Chlorodrepanis*. Frequently they become adherent to one's clothes in passing through the brush. Doubtless in high winds very young shells are sometimes carried to a distance in curled up leaves, in which they often hide. Once or twice in an open treeless space on Molokai I found shells which must have been carried this way or with small branches of trees during a severe gale. We have known sluggish beetles of the genus *Proterhinus* to be so carried far from their food-plant, doubtless only to perish of starvation.

In 1893 I took the opportunity of paying a good deal of attention to the habits and distribution of some of the arboreal *Achatinella* on Molokai, the shells of that island at the time having been less collected than those on Oahu. It was quite impossible not to be struck with the effect of isolation on individuals of some of these species. *Achatinella macrodon* (Vol. II, Pl. XI, fig. 16) was very common on a ridge close to my camp, but very local, for the next ridge to the west had none of it, nor did I see it on any ridge in that direction. After one had crossed one or two deep gulches eastward, an allied form appeared on the ridges, but with remarkable variations, tending to albinism. On the first-mentioned ridge it was comparatively constant, singularly so for an *Achatinella*. Whether it had once occupied the area between these localities and subsequently died out, or whether by some such means as I have indicated above, it had passed over this area, cannot be known.

Another instance of discontinuity of distribution was examined into, over a large area, in the case of the common and widely-spread *Achatinella tesselata*. This species I found abundant over an extensive irregular plateau, where I had occasion to collect often, at some distance N.W. of my camp. Here the shell was somewhat variable, of good size, and a striking albinoic form occurred. On this same area nine years later I found the shell much scarcer, but again the albino shells occurred. Away from this area and close to my camp on one ridge only, and only on part of this ridge, *A. tesselata* was found in large numbers, but of smaller size than the others, and very uniform both in size and colour, excepting that here it was strictly dimorphic, with two closely similar but easily distinguished and constant varieties. I was not able to find any continuity of distribution between the two areas mentioned, in fact I am sure that such did not exist.

When we consider the sluggishness of these molluscs, it is certain that the individuals of a species on two such areas, though the distance between them in mileage is small, would, but for some chance, remain isolated for ages, if not for ever. How stationary some of these land-shells are, I had many chances of observing, for in some cases I had the same individual under observation for weeks together. A white variety of *Achatinella redfieldi*, which I had occasion to pass by almost daily for many weeks, was always seen at rest just below the fork of a large branch of a lichen-covered Ohia tree. Though there were many showery or wet days, it was never absent from this spot by day, though it may, of course, have moved at night and returned. This was a healthy animal, the shell not at all worn by age. A small dead lichen-covered tree, supporting individuals of *A. theodorei* in 1893, was still occupied by these or their descendants three years later, the adjoining bushes being unoccupied. These shells had the appearance of being a stunted, depauperated form of *A. proxima*, produced by isolation on a wind-swept ridge with its stunted vegetation. In 1902 I looked in vain for this particular colony. To causes, as here given, is due the multiplicity of species or local forms of the Achatinellidae.

Probably few insects are so restricted in range, or so easily kept isolated, as are many of the Achatinellidae, for many of the most sluggish insects are, I think, likely to be more frequently distributed by accidental means than the Mollusca. Still in the insects there are cases known both of distinct species of similar habits and having the same food, which merely occupy a different area of the same island, and of a single species, which, occupying different areas, exhibits different variation in these two areas —or in fact is on the way to form two.

Very often, however, we find species, extremely closely allied, occurring habitually in the same locality and not geographically isolated. Thus, even within a few square yards, the three species of Longicorn beetles, *Plagithmysus darwinianus*, *P. lamarckianus* and *P. varians* occur. It is hardly conceivable that species can be more closely allied than these and remain distinct. Though so similar, the species keep quite apart. Each keeps to its own food-plant, and though occurring on adjoining trees the species do not mix nor interbreed. *P. darwinianus* has been found chiefly on *Sophora*, *lamarckianus* on *Pipturus*, *varians* on *Acacia*. We have observed great numbers of all these species in the field, but have never found even a stray specimen of one frequenting the tree affected by another or in company with it, even though these trees grew side by side. Thus these three species, though not geographically isolated, are isolated by their habits. I know no insects that could be more profitably experimented with by breeding in the field than these and other species of *Plagithmysus*.

It is certainly quite exceptional for a species of these beetles to forsake its proper food-plant and attach itself to quite a different tree, as is evident from the fact that a species in most cases has been found on one kind of tree and only one. It would be of great interest to know whether individuals, bred for the first time on a tree other than the normal food-plant, remain attached to that tree, or wander partly or wholly back to their original food. If we look at the case of *P. vitticollis* and its var. *longulus*, we find a great change of habits concomitant with so little change of the insect that the two are considered to be varieties of one species. The var. *longulus* is the common form, and is attached to a forest tree (*Bobea*), and, as usual, the larva burrows beneath the bark, but *vitticollis* bores out the stems of a species of *Rubus*. Most of the individuals of the latter, so far as the evidence goes, are easily distinguished from the var. *longulus*, so that the two may be considered on the verge of becoming distinct species. It is quite possible that when a *Plagithmysus* first takes to feeding on a new kind of tree, the females, though they may remain attached to the new food-plant, would attract males that have bred on the original one, but when one considers the entirely different nature of the food-plants of such varietal forms as *P. vitticollis* and var. *longulus*, or again of such closely allied species as *P. lamarckianus* and *darwinianus*, the foods of which are trees of quite different orders, with different odour and taste, the one an acacia and the other Urticaceous, one cannot overlook the possibility that this may aid in the isolation of the individuals on different trees. It is a familiar fact how quickly these beetles scent out and arrive at a tree that is their special food-plant, if it be by injury placed in a condition suitable for their oviposition.

In the case of *Plagithmysus bishopi*, of which quite identical examples have been obtained and bred from *Pelea* the normal food, and *Zanthoxylum* as an exceptional occurrence, where these trees grow side by side, the food-plants are much more nearly related and isolation might be less easily attained. Where isolation is complete, in another district of Hawaii, *P. bishopi* becomes *P. vicinus*, though still feeding on *Pelea*, the normal food-plant, but these two species have never been found in one locality. Why certain individuals of a *Plagithmysus* occasionally, but apparently very rarely, leave their proper food-plant to attack some quite different tree, is quite obscure. But on all such matters much further observation in the field is needed.

Sometimes we may find species as closely allied to one another as those above referred to, living actually in company and apparently having similar habits, but it is quite possible that special investigation will show important differences in habits. In the case of the flightless species of *Reduviolus* in the Hemiptera, for example, of which two slightly different forms, probably really distinct specifically, were found in the same habitat, a decided difference in the habits of these forms was observed. The case of the small crickets of the genus *Paratrigonidium* is more similar to that of the beetles of the genus *Plagithmysus*, referred to above, the distinction of habits in these being, as one might say, far more striking than the specific differences. I place the greatest importance on these changes of habits, leading to isolation, in the production of new specific forms.

The extreme variability of many of the insects and mollusca, whether in structure or colour, the indefinite character of the species in many of the genera, e.g. in the

Achatinellidae (Mollusca), the Proterhinidae (Coleoptera) and many other insects, might be considered due to the absence or slackness of those agencies, which elsewhere cause individuals less fitted to the environment to become eliminated. But it is obvious that the lack of definiteness of specific characters may be due to lack of time. When we consider that some of the creatures, which show the greatest individual variation, form a large part of the food-supply of the once extremely numerous insectivorous birds, and therefore might be supposed to have undergone a very rigorous selection, it would appear either that this selection has been singularly ineffective in producing uniformity of appearance in a species, or that the very great variability must be itself advantageous. It is interesting in this connection to compare the great variability of the underside (i.e. the parts exposed when at rest) of the native *Pyrameis* with the usual great constancy of those parts in the immigrant and allied *P. cardui* and *P. atalanta*, in explanation of which it may be urged that these, in their usual localities, undergo a hibernation for many months of the year and requiring therefore a more complete protection, when resting, have arrived at a constancy of markings that suit their resting places. *P. tammeamea*, on the other hand, is active all the year, and brood follows brood without any dormant period of the adult. Spiders of species most liable to be found by birds are often beautifully protected by their resemblance to their environment.

Species which exhibit an extraordinarily wide range of variability, form an interesting study in the islands, for we often find one or more distinct species so closely allied to these as to lead to the suspicion that they actually have been derived from the others. These probable offshoots from variable species are generally much rarer and less widespread than the latter, and probably generally, if not always, differ in their habits. In this case the causes, which have produced them, are similar to those mentioned above of other insects. They have the appearance of being extreme forms of the variable species, as though they had overpassed the limits of variability and become distinct. Their constancy is probably correlated with uniformity of habits.

There are some striking examples of discontinuous variation amongst the island insects, and the same have been noticed in the case of the Achatinellid Mollusca. The di- and tri-morphism in the colour of the legs of certain species of *Plagithmysus* is of a very conspicuous nature, owing to the large development of the femora in proportion to the body, these beetles in a slight degree having a cricket-like appearance. Even more striking are some of the dimorphic forms of the endemic Locustidae (*Banza = Brachymetopa*). There is no evidence to suggest from a comparison with allied species that these variations are likely to lead to distinct species, the different forms pairing indiscriminately and not differing in habits. In the case of one species of *Banza* (*blackburni*) a very remarkable form of sexual dimorphism is seen to be resulting from the two forms, but not a differentiation of species. The pairing of the Achatinellidae seems to have been very little observed, and I myself have only three times seen these animals in copula. Two of these cases were pairings between extreme varieties of *Achatinella redfieldi*, and in each case the individuals in copula were of exactly the same colour-form, one pair being the albino variety. The other case was that of another Molokai species, *A. macrodon*, the individuals being identical in colour. No importance can be attached to these few instances.

Reviewing the whole fauna, the widespread effect of segregation in species-formation becomes evident, whether the segregation is brought about by geographical isolation, or by change of food or habits. In the case of very sluggish animals, like the Mollusca, a mountain valley or ridge may prove an effectual isolating barrier, or in fully-winged insects a narrow interisland channel. Exactly how far modification is due to the direct effect of food or difference of habits and how far to the mere fact of segregation is not known, but it appears to me that segregation is the most important. The extraordinary series of well-defined but closely allied species of Homopterous insects, each attached to its own special food-plant, are very interesting in this connection. Considering the fact that individuals frequenting the same food-plant, but geographically isolated, are so often modified as to form distinct species or races, isolation appears the most important factor. The little Drepanid bird, *Himatione sanguinea*, of vagrant habits and inhabiting all kinds of stations throughout the main group of islands, on remote Laysan is replaced by the allied *H. freethi*. A few individuals of the former, chancing to reach that remote island, would probably remain isolated for ages, and this is probably what has happened in the past, the modified *H. freethi* being the result.

Summary of general part of the Introduction.

The Hawaiian fauna cannot be said to belong to any of the great faunistic regions of the globe, it contains most important elements derived from the Oriental region, from the Australian and from the Neotropical or at least from the warmer parts of America, and it cannot be considered as even belonging chiefly to any one of these regions. On present information it is decidedly not Polynesian, but a proper study of the Samoan and other groups may show greater affinities with these than is apparent to-day. The Fijian fauna is extremely unlike the Hawaiian in nearly every respect. The small islands (Christmas, Fanning, etc.) that lie nearly midway between Hawaii and the Samoan group are in sad need of exploration, as also is the latter. Many of the most important components of the fauna are so remarkably isolated (e.g. the Achatinellid Mollusca and many groups of insects richly represented in species) that we cannot even conjecture whence they have been derived. Even the family Drepanididae in the birds has somewhat doubtful affinities, as also has the genus of thrushes *Phaeornis*.

The antiquity of the group must be extremely great. The possibility of an ancient continent, even were it probable geologically, cannot for a moment be entertained by the student of the whole fauna. We should require connection with or approximation to the Oriental region, just as much as to the American continent and Australia. There is no possibility of an ancient land connection having existed even between the islands of the group themselves during the period in which they became colonized by the progenitors of the present fauna. Some groups of insects, considered by themselves, may show nothing actually opposed to this supposition, but others prove it to be quite untenable. Of those who have worked on the material collected by me, I think Lord Walsingham alone has favoured the idea of an ancient continuous land area. But the study of these winged insects is not favourable for forming a conclusion on this point. If we consider other of those that are evidently amongst the most ancient inhabitants of the islands, we see the impossibility of such a theory. The absence of *Achatinella*, s.l., from Kauai at one end of the group, and its almost total absence from the great forests of Hawaii at the other (where only a single type represented by two or three species is known), the presence of *Carelia* on Niihau (until recently) and Kauai, but absent from all the other islands, may be noticed in the Mollusca. The development of highly specialized endemic genera of Finch-like Drepanididae on Hawaii and their entire absence from the other islands, except for a vagrant, ubiquitous form (*Psittacirostra*) and one other (*Pseudonestor*) peculiar to Maui, the island nearest to Hawaii, are noteworthy in the birds. The vast development of species of the endemic flightless genera of Carabidae, allied to *Cyclothorax*, on Maui and its neighbouring islands, their poverty in Oahu, and total absence from Kauai, may be cited in insects. The lack of a single individual of great groups of animals containing countless species, ubiquitous in every land, except very remote Oceanic islands, not only forbids the idea of any continental area, but leads us to conclude that the islands have never been even in past ages much less isolated from other lands than they now are. We have elsewhere shown the difficulty that creatures, whose ancestors must have traversed thousands of miles to reach the islands, have had in spreading throughout the group, and even after ages many have not achieved this. This is certainly more or less attributable to that sluggishness which appears so generally to overtake the descendants of animals that reach the sparsely inhabited forests of these remote islands. On Hawaii we observe even in birds so powerful as the native buzzard and the crow, an unreasonable restriction to that one island, and even to parts of that island. In the Hawaiian islands and elsewhere, the loss of flight of so many insects and less frequently of birds follows disuse. Given sufficient time (and the extraordinary antiquity of the archipelago is manifest) all the phenomena of the fauna are readily explicable on the supposition that a comparatively small number of immigrant species have at various periods been able to reach and establish themselves in the islands. With a disinclination to wander, as seen in the case of the crow and buzzard, above mentioned, it has often taken the descendants of these immigrants ages to spread over the whole group. Some like the Pterostichine beetles have apparently not yet fully done so. Peculiarity seems often in proportion to the isolation, this roughly depending, in the case of the different islands, on the width of the channels between them. Where we study allied species, Kauai has these as a rule most highly modified. Its 'Oo,' *Acrulocercus*, is almost generically distinct from the others, its *Loxops* is the most aberrant, it alone has two species of *Phaeornis*, one being by far the most aberrant, its 'Elepaio' (*Chasiempis*) is the most different, it alone has two distinct species of *Chlorodrepanis*, the one structurally at one end the other at the other extreme of the series, these birds hardly differing on the other islands. Its *Amastrae* in the land-shells have produced the most remarkable of all forms in the subgenus *Kauaia*, and probably from a still earlier immigrant *Amastra* (or antecedent of *Amastra*) has developed the remarkable series of *Carelia*, the young of which are in many ways so like *Amastra* itself. I have reason to believe that in many cases, where we now find the greatest variety of allied species of any group of animals, that island is the place whence all the species originated, or in other words the place where the original immigrants became established. It is difficult to compare one group of animals with another, as regards the importance of the modification that exists, but I cannot see in the existing Achatinellidae any greater modification to have taken place than is observable in the present components of the Hawaiian Nitidulidae, or Anchomenine Carabid beetles, or in the Drepanid birds. It is interesting to note that the island of Hawaii, which is sometimes loosely stated to be the 'youngest' island, is in my opinion the one on which the last-named birds were first established. But it must be remembered that Hawaii is a composite island, and its northern part is of very great age and existed long prior to the bulk of the island, and coincidently with the oldest of the other islands of the group, so that the Drepanid birds may have reached the northern portion, before the rest rose above the sea. The more recent parts have themselves existed for ages and, when their forests became continuous with those of the original island, it would take a comparatively short time for the whole to be occupied by birds. There is no existing genus of Drepanididae which does not occur on Hawaii (unless the Molokai 'mamo' be considered generically distinct from *Drepanis*), excepting the parrot-billed *Pseudonestor* on the next island, Maui, and the crested *Palmeria* of that island and Molokai, a form allied to the vagrant *Himatione*. But Hawaii itself, in addition to all the other Drepanid genera, alone has the specialized *Ciridops* and *Viridonia*, as well as the three more allied genera, *Loxioides*, *Rhodacanthis* and *Chloridops*, indicating excessive antiquity of its avifauna.

Review of the Hymenoptera.

The Hawaiian Hymenoptera are remarkable for the extreme paucity of the number of families of this vast Order, that are represented by endemic species. The saw flies or Phytophaga, considered by some as a sub-order, are totally unrepresented. Ashmead in 1900 recognized 94 families in the Hymenoptera, and this number may be taken as approximately correct, for while some of these groups are in our opinion unworthy to rank as families, yet others are formed of discordant combinations of genera, which he freely admits are of quite different ancestral origin, and a proper classification of these will make good any loss in number caused by the sinking of groups, that he considered as distinct families.

Excluding forms that are known to be introduced, or from various kinds of evidence are almost certain to prove so, the endemic Hymenoptera represent only the following families: (1) Prosopidae, (2) Crabronidae, (3) Pemphredonidae, (4) Eumenidae, (5) Bethylidae, (6) Poneridae, (7) Proctotrypidae, (8) Diapriidae, (9) Scelionidae, (10) Mymaridae, (11) Figitidae, (12) Miscogasteridae, (13) Encyrtidae, (14) Pteromalidae, (15) Eulophidae, (16) Ichneumonidae, (17) Braconidae. Moreover of these 17 families four are only represented by a single species that can really claim endemicity (Poneridae, Proctotrypidae, Pteromalidae, Braconidae), so that these can be looked upon as comparatively recent additions to the endemic fauna. It will be seen that I have excluded a number of families, which contain species not at present known outside the islands, and it is possible that a few of these species are really endemic, though I think this is unlikely.

I will now refer to those more or less doubtful species which cannot positively be considered as foreign importations, as well as to some of those that are without doubt of human introduction. In the latter class are *Xylocopa brasilianorum* (*aeneipennis*), *Megachile palmarum*[1] and *M. schauinslandi*[1], and *Apis mellifica* amongst the bees. Only two of these insects, the *Xylocopa* and *Apis*, occurred to Blackburn, when collecting, and as the two *Megachile* are very common Honolulu insects and, further, have spread widely thence in the last 17 years, we can be sure they have been imported and were not present in the islands even 30 years ago. *Apis* and *Xylocopa* are of earlier introduction, the latter being well known to have been non-existent here till long after the settlement by foreigners. It was no doubt brought from the warm parts of America, when formerly ships visited the islands frequently from that region. In the Fossorial group an American *Stigmus* was once taken in the middle of the town of Honolulu and appears to have not established itself, while a *Sceliphron* of early introduction from America (known, however, not to have been present before the foreign settlement) and a *Trypoxylon* of recent importation from China, are now both widely spread and thoroughly naturalized. Both these insects are semidomestic in habits.

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[1] The former of these is now known to me from California, the latter from China.

The two species of *Pison*, mentioned in my account of the Hymenoptera, published in 1899, have now a third congener of quite recent introduction, it having first appeared in 1903. All these frequently breed in or on the woodwork of houses, in cavities in chairs or furniture, etc.

The two Asiatic wasps, *Polistes macaensis* and *hebraeus*, of wide distribution, and the American *P. aurifer* are also certainly importations by man, being quite unknown in the earliest days of foreign settlement; in fact of the two former species *P. hebraeus* was of late introduction, not having occurred to Mr Blackburn, nor was it generally spread over the islands 20 years ago.

Several Bethylidae are more or less frequent household insects, being doubtless parasitic on others, which attack grain and other produce, or burrow in woodwork. Such are the species of *Epyris* and others undetermined.

Of the ants, I think all those now existing may be considered as importations, excepting a variable *Ponera*, chiefly found in the forests, and clearly intolerant of the presence of most of the foreign forms. It is, however, quite probable that other endemic ants have previously existed and become totally exterminated before collections of insects were made.

It is not necessary here to detail the minute species of the Chalcidoid and Proctotrypoid series that are clearly introduced, but I will now turn to several Hymenoptera that are not so clearly introductions by man.

Of the bees we have *Megachile diligens*, a species found by Blackburn in Honolulu more than thirty years ago and still occurring in gardens in the town. Now, however, it is widely distributed over all the islands, but shows no noticeable variability, and, so far as I have observed, forms its tubular leaf-cells always from plants of foreign origin. It will almost certainly be found elsewhere. Clearly the Megachilidae are easily imported in lumber or furniture, as since Blackburn's time *M. palmarum* and *M. schauinslandi* (both of which commonly nest in houses or furniture, the latter not using leaves, but filling the key-holes of the doors with resinous wax) have appeared, and later still (in 1900) the black *Lithurgus albofimbriatus* was established.

In the Chalcididae, *C. polynesialis* is a doubtfully imported species, which still occurs in gardens in Honolulu, but its presence is now masked by the swarms of *C. obscurata*, introduced for economic purposes. It appears to show considerable variability. *Epitranus lacteipennis* still occurs rarely in Honolulu, where its habits are not known. Another Chalcidid is of late introduction, having appeared about 1900.

The Evaniid, *E. sericea*, will almost certainly prove to be foreign; it is bred from the ootheca of foreign cockroaches.

The Braconidae, excepting the Spathiine, *Ecphylopsis nigra*, are almost certainly all foreign, though some were taken by Blackburn more than 30 years ago. The two of these that seemed most likely to prove endemic were *Ischiogonus palliatus*, which so often attacks the endemic longicorns, and *Microdus hawaiicola*, but the former, which also destroys larvae of imported longicorn beetles and apparently those of other families, is now known elsewhere, and the latter is a parasite of introduced Tineid moths and known also from Fiji.

To return now to the families that are represented by positively or probably endemic species, we shall see that though the number of species is frequently large in these, proportionately to the size of the islands, the number of genera represented is very small.

The Prosopidae are represented by 53 described species of one genus *Nesoprosopis*, which is not endemic, since an European[1] species agrees with the Hawaiian series in its essential characters.

The Crabronidae contain five genera closely related, as it appears to me, to one another, but sufficiently distinct from foreign forms to be separated generically. The European *Crabro vagus* is related to the least remarkable of the Hawaiian species. None of the other diverse groups of *Crabronidae* have any representatives in our fauna. There are 18 Hawaiian species.

The Pemphredonidae have two well-marked genera in the sub-family Pseninae. They are intimately related to one another and no doubt of common origin and are allies of the widely spread genus *Mimesa*. There are 10 species, equally divided between the two genera.

The Eumenidae are represented by 104 species, included in the almost ubiquitous genus *Odynerus* together with three other genera that are endemic. These three genera, however, are intimately related to some of the island species assigned to *Odynerus* itself and are evidently local derivatives from the same stock, produced within the islands. Those assigned to *Odynerus*, on the other hand, are, I now think, clearly descendants of two quite distinct forms of original immigrants, one of which gave rise to the bulk of the species, as well as to the endemic genera that I have separated from these, while the other has produced but four distinct species, as at present discovered, and its origin was Asiatic.

The Bethylidae (incl. Dryinidae) have four genera represented, none of these being endemic. *Scleroderma* has 10, *Sierola* nine, *Pseudogonatopus* two, and *Echthrodelphax* a single species. The latter may not impossibly prove to be specifically apodemic, as well as generically. It is of Australian origin, as also is *Sierola*.

The Poneridae are represented by one endemic species of *Ponera*, which exhibits much variability, the variation being apparently due to local influences to some extent.

The Proctotrypidae have but a single species of *Proctotrypes*, parasitic on endemic Diptera in the forests. It is said to be allied to a North American species.

The Diapriidae are represented by three described genera, one of which is not endemic and the other two appear to me to be derivatives of the latter. One in fact seems hardly more than a flightless form of the apodemic genus *Phaenopria*, under which I have described species. Probably, however, Hawaiian *Phaenopria* will prove generically distinct from species in other countries. There are nine described species, and doubtless a good many more remain to be discovered.

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[1] A species, *N. chinensis*, is now known from China.

The Scelionidae are represented by six species of *Anteris*, and a single one of *Baeus*, which belongs to a different sub-family. All are truly endemic, as also may be one at least of the genus *Telenomus*, representing yet another sub-family.

The endemic Cynipoids belong all to the family Figitidae, and to one sub-family of this. Though placed in a number of genera, one of which was described as new, by Ashmead, the rather numerous species that are known appear to me to be all related to one or two types, and probably should be assigned to not more than two or three genera, a view taken by Kieffer without examination of specimens. They present great difficulties in determination, but 23 species have been described without dealing with male examples, which cannot certainly be referred to species of the other sex. I here treat the Hawaiian forms as belonging to only two genera.

The Mymaridae are represented by 15 species of the genus *Polynema*, other groups (sub-family and tribes) being unrepresented.

In the Chalcidoid series the Miscogasteridae have 10 species, placed in four genera and two sub-families, but the characters distinguishing these sub-families are very slight, and I have even had some doubt whether there is any real generic difference between some of the Hawaiian species referred to, the chief genera representing the two sub-families. Some undescribed species are known to me, and doubtless a good many more remain to be discovered. Two of the genera representing the sub-family Lelapinae are endemic. The Encyrtidae is perhaps the most important family of the Chalcid super-family, the sub-family Eupelminae being represented in all by four genera, one of which is supposed to be peculiar (*Solindenia*). The single *Anastatus* is clearly imported, being parasitic on eggs of a Locustid, known to have been introduced, nor is it very certain that *Eupelminus*, represented also by one species, is really native. *Solindenia*, the endemic genus (also with only one species), is less liable to suspicion, but not altogether free therefrom, for it certainly occurs, where no endemic host is found for it to parasitize.

Eupelmus, on the other hand, contains a large number of endemic species, 54 having been described. They are of very varied habits, and as Ashmead recognized but few in the large number of examples that he handled, I fancy he must have lumped together a number of distinct forms. Perhaps I have myself separated them too minutely.

The Encyrtinae are represented by six species of the genus *Anagyrus*, which appear to be endemic. This however is uncertain until their habits have been studied, since in other countries the genus attacks Coccidae, and therefore numerous species might easily have been imported with scale insects, accidentally, or perhaps in some cases intentionally by Koebele. The members of the tribe Mirini I look upon as foreign, with perhaps one or two exceptions.

The vast complex of forms included in the Pteromalidae can only be said to be represented endemically by a minute *Spalangia*, a true forest insect, allies of which may be expected to be found.

The Eulophidae have a greater number of genera containing endemic species than the Encyrtidae, but in most of these only one or two species have been described. The Aphelininae and Tetrastichinae are foreign and need not be considered. The Entedoninae, Elachistinae and Eulophinae must be considered as having endemic species. These include seven genera and only eight species, as described. This, however, gives an erroneous impression of the group, for a good many more species have been collected (in several of these genera). After death most of them rapidly dry, and distort to such an extent as to utterly unfit them for description.

The vast group of Ichneumons are represented only by a single endemic species of *Echthromorpha* and two of *Glyptogastra* (an endemic genus) in the Pimplinae; in the Ophioninae by three endemic genera *Banchogastra*, *Pycnophion*, and *Pleuroneurophion* (six species in all), as well as a large number of endemic species in apodemic genera. *Ophion* has one species, *Enicospilus* 13, *Eremotylus* 1, *Athyreodon* 2, *Atrometus* 11, *Limnerium* (1), *Lathrostizus*[1] + *Idecthis*[1] 2, *Pristomerus*[1] 1. The claims of the species in the four latter genera to be endemic are, however, more or less doubtful, and one other species of *Limnerium* is certainly introduced.

The Alysiidae and Braconidae are, doubtless, all foreign, excepting only the minute *Ecphylopsis nigra* (the genus being endemic) of the sub-family Spathiinae.

There are therefore 52 genera in the Hymenoptera represented by endemic species (though in a few cases the endemicity of these is questionable) and these species number 372, or seven species to a genus on the average. If we exclude those questionable species, the average would be rather higher still.

Comparing the Aculeate Hymenoptera, i.e. ants, bees and fossorial wasps, with the remaining families or 'Parasitica,' we find in the former only 13 genera with 186 species, an average of about 14 species to the genus; in the latter 39 genera also with 186 species, an average of 4·7 to the genus.

This very great difference in the average of species in the two groups will no doubt be subject to considerable alteration and will not prove so vast, as now appears, though I believe it will remain considerable. In many cases, owing to their specialized habits, the parasitic forms have less scope for a great increase of species owing to their dependence on a limited number of hosts. Thus the Eulophidae, several of which are parasitic on leaf-mining caterpillars, are limited in species by the comparative scarcity of species of Lepidoptera having these habits.

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[1] Further observations render it certain that these have been introduced.

On the other hand we find that the genus *Eupelmus*, which can adapt itself to very varied hosts, attacking eggs, larvae, and pupae of other insects, and various orders, e.g. Coleoptera, Hymenoptera, Diptera, Orthoptera and Neuroptera, in the small limits of the islands, has produced an exuberance of species.

But we must also make allowance for the minute size and hidden life of most of the Parasitica, as compared with the comparatively obtrusive presence of the Aculeata, rendering the latter so easy to collect. And still further, while the bees and wasps are comparatively of large size, presenting obvious characters for specific separation in sculpture and general appearance, as well as others afforded by the genitalia, mouth parts etc., which are easily examined in larger insects, the minute forms, included in the Parasitica, are much more difficult to discriminate. The closely related species of *Odynerus*, inhabiting different islands, if reduced to the size of Mymarids, and subject to post-mortem distortion, like these and the smaller Chalcidoids, might in many cases prove impossible to separate.

Of the 52 genera, that contain presumably endemic species, 17 are, so far as our present knowledge goes, themselves endemic. While 10 of the 13 aculeate genera are considered endemic, only seven of the 39 parasitic genera are so. This, however, is not of any great significance, but merely indicates that in the larger Aculeata it is possible and convenient to distinguish groups of Hawaiian species from one another or from allied genera in other countries.

PROSOPIDAE.—All the Hawaiian species belong to a single genus *Nesoprosopis*, which I made for these island forms, not knowing at the time that similar characters existed in foreign *Prosopis*. Subsequently by a curious coincidence, when collecting in England, I discovered a bee, new to the English fauna, having the essential characters of *Nesoprosopis*. This species is the *Prosopis kriechbaumeri* of the European lists. Although I have examined the structures in numerous European, Australian and American[1] *Prosopis*, I have not yet found any other species allied to this European form, nor, consequently, to the Hawaiian ones. It is greatly to be regretted that the terminal segments, which exhibit such fine characters for specific and generic separation, are generally entirely neglected by describers of Prosopidae, so that for American and Australian species I have had to rely entirely on my own observations. Possibly it will be found that the European *P. kriechbaumeri*, or others allied to it, extend their range, like other insects, across Asia, and this would point to an Asiatic[2] origin for the Hawaiian *Nesoprosopis*. There is no doubt that had *P. kriechbaumeri* been handed to me amongst a collection of Hawaiian species, as coming from the islands, I should not have hesitated to consider it as an endemic

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[1] An excellent paper on these has been published by Mr C. W. Metz (Tr. Am. Ent. Soc. XXXVII, p. 85) since this paragraph was written.

[2] A species has now been discovered in China by Mr J. C. Kershaw.

form. It is most nearly allied to the Hawaiian species of the *N. longiceps* group. The Hawaiian *Nesoprosopis* form a very varied assemblage, tending to split up into a number of genera or sub-genera. The superficial differences between such extremes as *N. crabronoides* and *N. paradoxica* are extraordinary, but throughout the whole series of forms the essential characters of the genital armature and seventh and eighth ventral segments remain the same, and bear strong evidence to the taxonomic value of these characters.

The *Nesoprosopis* are almost the most ubiquitous of any Hawaiian insects. They are found in the hottest and driest coastal regions, when vegetation springs up after the rains, and in the mountains extend their range far above the forest line to the limits of vegetation. Some of the species frequent the most different stations, e.g. *N. volatilis*, which has been found on the hottest coasts and at all elevations in the mountains to a height of 9000 ft. in the region of snow in winter time. Many range from the coast to about 4000 or 5000 ft. above the sea, especially *N. facilis* and allied species. Others are purely littoral or range but a short distance inland, e.g. *N. longiceps*, *blackburni*, *hilaris* etc. The members of some of the groups, however, confine themselves to similar stations. Thus the small or moderate-sized short-faced species of the *N. laticeps* group are only found in more or less dense forests, where there is much shade and constant dampness. The large forms with punctate abdomen are also true forest insects. Some species exist in, and in fact favour, the wettest and densest forests in the islands, where the ground is always saturated with rains or in the condition of a bog. *N. laticeps* and *N. satelles* seem to thrive in such situations.

In their nesting habits there is considerable variety. On the coast or lowlands, or where the soil is sufficiently dry or sandy in the mountains, many form their burrows in the ground, often, however, availing themselves of the pith cavities of dry branches or twigs. Those frequenting denser and wetter woods in the mountains, of necessity, burrow in dead tree stems or in hollow branches. Some affect the hardest tree-trunks, e.g. of Ohia (*Metrosiderus*), sandal-wood, Mamani (*Sophora*) and utilize, when they can, the borings of xylophagous beetles. Trees like the Lobeliaceous *Clermontia*, the dead branches of which are hollow, and afford a fine protection against the damp, are frequently colonized by the larger species, such as *N. fuscipennis*. Some of the species seem to be of solitary habits and are rarer, while others sometimes form great colonies, whether in the ground (e.g. *N. difficilis*, *facilis*, and many others) or in dead tree-trunks, hard or rotten (e.g. *N. paradoxica*, *melanothrix*, etc.).

Being so widely distributed, naturally a very great variety of plants are visited by the different species in search of honey and pollen. On the coast and lowlands, foreign, immigrant plants are mostly visited. The chief of these are *Sida*, *Waltheria*, *Vitex*, *Capparis*, *Scaevola* and *Tribulus*. In the same situations, where the forest trees do not extend to the lowlands, a few endemic plants are also visited such as

Hibiscus brackenridgei, composites such as *Lipochaeta* and depauperated forms of *Santalum*. These lowland bees have taken freely to many introduced plants, such as *Prosopis* and other acacias amongst trees, as well as garden flowers of various kinds. In the mountains the Ohia tree in general is visited by all species of the genus, as it affords abundance of nectar easily reached by these short-tongued bees. Many other flowers are attractive in their season, *Acacia koa*, *Straussia*, the mountain species of *Scaevola*, *Rubus macraei*, etc. In the regions of frost and snow, *N. nivalis* and others are partial to the flowers of *Cyathodes*. In some forests, where a foreign *Rubus* has become a pest, they visit these flowers in great abundance. The different species of these bees by no means restrict their attention to one kind of plant, but collect from the most diverse kinds.

The most interesting fact in connection with the Hawaiian Prosopidae is that a small group of five species of *Nesoprosopis* has become inquilinous or parasitic on their industrial congeners. As is well known, amongst bees in general, parasitism of this kind has arisen independently in various groups. Thus the Megachilidae (sens. lat.) have given rise independently to the *Coelioxys* group of parasites (Coelioxinae Ashm.) through forms allied to *Megachile* itself, and to the *Stelis* group of parasites through forms allied to *Anthidium* (Anthidiinae Ashm.). The Anthophoridae have given rise to the parasitic *Melecta* group (Nomadidae *partim* Ashm.) while the origin of some other parasitic forms is still involved in doubt. The case, hitherto known, in which the least modification has taken place between host and parasite in bees is that of *Bombus* and *Psithyrus*, where the males differ very slightly in structure, although Ashmead has gone so far as to make these genera represent distinct families. In all these cases the main difference between the parasite and the industrial form, from which it has sprung, lies in the disappearance of such structures as are concerned in the gathering of food for the nurture of its young, and therefore the female parasite is chiefly affected in most cases. This is likewise the case in the parasitic *Nesoprosopis*, the distinctive curved hairs of the front tarsi, whereby the pollen is swept towards the mouth, having undergone obvious modification. I cannot, however, see the slightest character, whereby the males could be separated generically from the industrial forms; some of them indeed are not too easily separated from the latter specifically. It may be supposed that these Hawaiian species show the earliest stage in modification of industrial bees into parasitic, as at present known. Their parasitic habits are complete, that is, the parasitic forms never store their own cells.

The cells of *Nesoprosopis* are translucent and of dry gelatinous appearance, being impervious to the fluid honey stored therein. Such pollen as is mixed in this honey, is regurgitated with it, since the Prosopidae possess no external arrangement for carrying a load, as do most industrial bees. Rapid inward strokes of the front feet, which, as has been said, are provided with special hairs, sweep the pollen grains from the anthers of the flower towards the mouth.

A good many of the species of *Nesoprosopis* exhibit considerable variability and this not merely affects superficial characters, such as the facial or other markings, but important structures are involved. Thus in *Nesoprosopis flavifrons* I have noticed variation in the amount of dilatation of the scape of the antennae, so that, in this respect, some examples more nearly resembled the allied *N. anthracina* than did others. Similar variation has been noticed in other species having a strongly dilated scape. The small median facial plate above the clypeus sometimes varies in its relative length and breadth. In the case of *N. difficilis* and *N. volcanica*, two very similar species, often occurring together, I found that the majority of many specimens that I examined could be distinguished by the shorter supraclypeal plate of the former, but that examples occurred in which this distinction was not maintained. These two species, I should add, are perfectly distinct by other constant characters.

Some of the parasitic species are especially variable in size, and this variation is often striking, when examples from different localities are compared in series. It is due entirely to the amount of food supply consumed, and this amount depends on the species of the host, in the nest of which the parasite is nurtured. On one occasion I obtained specimens of *N. volatilis* of gigantic size for this species, these having been bred in a colony of *N. assimulans* var. *oahuensis*. The same species when obtained from colonies of *N. laeta* or *N. difficilis* is much smaller. In some localities one may find very large and very small examples of *N. hilaris* in the same station, the former being bred on the store of *N. assimulans* and *longiceps*, the latter on that of *N. blackburni*. As will be seen from these remarks, the parasitic *Nesoprosopis* are not at all confined to one species of host. However, they only infest the nests of such species as burrow in the ground. Those that burrow in the trees have never been found to be affected.

These latter, however, have their true parasites (i.e. not inquilines, as the others would be more correctly called) in the shape of the Encyrtid Chalcidoids of the genus *Eupelmus*, which are bred from the cocoons of some of the larger species, and very probably affect the smaller also. On one occasion I saw an extraordinary congregation of males of one of these *Eupelmus*, forming a complete circle around the entrance of the burrow of *Nesoprosopis setosifrons*, the heads of all the parasites resting on the edge of the mouth of this burrow. Their antennae were kept in constant vibration and those of each individual were continually crossed with its neighbour's, evidencing great excitement. No doubt the burrow, which was one of several in a very hard dead tree, would, if opened, have revealed one or more females of the *Eupelmus* ready to emerge. *N. fuscipennis*, a species common in the mountains near Honolulu, is attacked by the same or an allied parasite, as also is its var. *obscuripes* on Maui.

Many of the species of *Nesoprosopis* are extraordinarily abundant and I doubt whether any species is really rare. Some of them appear at irregular intervals and so in any locality are easily missed. My experience with the remarkable little

N. crabronoides well illustrates this point. Originally, with difficulty, I obtained a few females, and on various other occasions at the same place and time of year failed to find even one. Yet on another occasion, also at the same season, I observed many scores in a few hours in this same spot. Similar instances have frequently been noticed, and a species which is abundant one year in the summer months may on another occasion appear at quite a different season in the same locality. It is in some respects rather interesting to note that the Hawaiian *Nesoprosopis* most nearly allied to the one apodemic species are the littoral species of the *N. blackburni* group, while the forest-frequenting forms include those most extremely divergent from these.

Comparatively few of the species are distributed over many of the islands of the group, but *N. facilis* and *difficilis* are found on all the islands excepting Kauai, where the former is represented by an extremely closely allied form, and *N. laeta* occurs on all. Several species are common to the three neighbouring islands Lanai, Maui and Molokai. Many are peculiar to a single island and further investigation is not likely to prove this incorrect in the case of a good many species. Thus *N. setosifrons* is represented on Oahu by *N. anomala* and on Kauai by *N. perspicua*, while at present no corresponding form has occurred on the other islands. *N. insignis* of Hawaii is represented on the three intermediate islands by *N. satelles*, and probably on Kauai by *N. andrenoides*, while no corresponding form has so far been found on Oahu. The *N. dumetorum* group has an allied species peculiar to each island, excepting Oahu and Molokai.

As far as our present knowledge goes, the endemicity of the species as regards islands is as follows: Hawaii has 18 species endemic, Maui 6, Molokai 1, Lanai 1, Oahu 3, Kauai 8. It is clear that the interchange of species between the three neighbouring intermediate islands is much easier than between others of the group, although Maui, a large island, with great variety of natural conditions, contains six endemic species. If we treat these three islands as one we find that together they have 13 that are not found on other islands, each in fact being well endowed with species of the genus. Thus the small island of Lanai has no less than 14 species, while but one is endemic, and even that one is likely to be found on Molokai. Oahu seems to be poor in its Prosopid fauna, only 11 species being at present known (or three less than on little Lanai), but of these three are endemic. Kauai is poorest of all in number of species, only nine being known, but eight of these are endemic. Hawaii stands alone in the richness of its species, which number 24, and no less than 18 are endemic. These figures no doubt are subject to slight alteration, for in one or two cases species described as distinct in Vol. I, pt. 1 of this work are likely to be sunk, as being merely varieties. I should add that since this part was published several species have been found to have a wider distribution than is indicated therein, and in the figures given above these new localities have been taken into consideration.

XYLOCOPIDAE.—*Xylocopa brasilianorum* (or *aeneipennis*) is an abundant and even injurious species, since it does considerable damage by riddling fence-posts, telephone poles and other wood with its borings. It also burrows in living trees, but I think only in the dead parts or such as are nearly dead, choosing generally the softest kinds of wood. I think there is no doubt that it was imported by man in lumber. It was unknown until after the islands were settled by foreigners. It is interesting to note that its habits are such, as might have enabled it to reach the islands by natural immigration, for it is particularly fond of breeding in dead logs on the sea-beaches, especially in the very light, dry logs of the 'wiliwili' (*Erythrina*). It is also very partial to the dead branches of this tree, when still growing. This *Xylocopa* chiefly inhabits the littoral or low mountain regions. It visits many kinds of flowers, especially papilionaceous ones. The larvae and pupae are often destroyed wholesale by the foreign ant *Pheidole megacephala*, which enters the burrows in swarms, and we have seen a whole colony of the bee eliminated by this minute enemy.

MEGACHILIDAE.—The three *Megachile* are probably all introduced, two indeed are of recent importation and have increased their range and numbers enormously in the last 16 years. *M. diligens* is widely distributed over the islands, but shows no local variation. It was found by Mr Blackburn in Honolulu more than 30 years ago, but we have no record of its distribution at that time. It still is found in the gardens in Honolulu. In the country it is generally found along the coasts or lowlands. Its nests are formed of leaves of various imported Acacias. On sandy coasts we have observed the bees very plentifully in the flowers of *Ipomoea pes-caprae*, but it visits those of other naturally immigrant or native plants, and in gardens in Honolulu has been taken on *Cosmos*, *Plumbago* and various introduced flowering shrubs.

M. schauinslandi is, I have little doubt, an Asiatic importation. It is not a leaf-cutter like its two congeners, but seals up keyholes and cavities, in which it breeds, with masses of resinous matter. It is extremely abundant in gardens in Honolulu, visiting many kinds of flowers of cultivated plants as well as weeds.

M. palmarum was probably introduced about the same time as the preceding and is also very common and now widely distributed. Its nests of the usual leaf-formation are often found in houses in holes or crevices, e.g. between the slats of window blinds. They have been found in large numbers concealed in leaves of various palm trees, which had been rolled and spun together by the caterpillars of *Omiodes blackburni*, an injurious Pyralid moth. It visits many kinds of flowers, cultivated and other.

A still more recent importation, at present found only on Oahu, is a species of *Lithurgus*[1], which was first noticed in some numbers in 1900. It is locally abundant and widely distributed over this island. In some remarks that I published elsewhere on this species I stated that the labial palpi were four-jointed, in error, for there are but three joints, the terminal one having in some aspects an appearance of forming two. The mouthparts of *Lithurgus* are, as I have pointed out, extremely unlike those of ordinary Megachilidae, the tongue being extended far backwards along the breast. This species nests in wooden posts, sometimes forming extensive colonies. We have seen such a colony in the upright posts supporting a house in the Nuuanu valley, and others elsewhere. The bees are very partial to the flowers of *Ipomoea pes-caprae* and other Ipomoeas. Sometimes many examples may be found asleep in these flowers, after they have closed up for the day. This species is I believe of Asiatic origin.

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[1] Determined for me by Prof. Cockerell as *L. albofimbriatus*, found in Tahiti. Probably an introduction into both countries from the Oriental region, whence I have seen forms hardly different.

Pemphredonidae.—The Mimesidae, which in the systematic account I considered a family, are perhaps better treated as only a sub-family of the Pemphredonidae.

The two genera represented have I think certainly originated from one ancestral immigrant form, the home of which is quite uncertain, as the genus *Mimesa*, to which they are allied, is of wide distribution, inhabiting both the new and old worlds.

The Hawaiian forms are easily distinguished by the great length and slenderness of the basal joints of the antennal funicle, the long petiole, and the remarkable head structures of the females. In the one genus these consist of a remarkable genal spine, in the other of a peculiar modification of the clypeus.

In most of the species of *Nesomimesa* the genal spines vary much in development, but the form in examples, in which they are fully developed, is more or less characteristic of the species. This great variability renders their specific separation difficult and the males are extremely similar in all the species. In *Deinomimesa* on the other hand the clypeal structure does not appear to vary to any noteworthy extent, though some of the species vary a good deal in other structures.

It seems quite certain that both these peculiar structures are in some way connected with the capture of their prey; in the one case (*Deinomimesa*) the effect is to produce a kind of large spurious mouth opening, in the other (*Nesomimesa*) the long fringed mandibles, when agape, and the pendent spines also form a sort of trap for the seizure of the prey. The variation in individuals in the development of these spines is very remarkable, for they are frequently extremely reduced in size. One would suppose that a structure of this nature and importance would be quickly brought to a state of great constancy by the operation of natural selection. On the supposition that I am correct as to the use of these spines, and it is difficult to doubt this, the variation exhibited by most of the species is very surprising. I believe the Kauai species, which is more distinct from the others, than they are from one another, is nearly constant in the form and development of its genal spines.

As in the other endemic species of Aculeate Hymenoptera, occasionally one meets with specimens of these insects in which the abdomen is of a reddish colour instead of black, a familiar variation in many kinds of Aculeates in other countries, and apparently due to the adults having preserved the coloration of immaturity.

All the Hawaiian species of both genera are true forest insects and most of them may be seen in large numbers, where they occur, flying round ferns and bushes in sunny places. The males are often much more numerous apparently than the females, but this is due to the more retiring habits of the latter, which, when they have begun to provision their nests, frequent dark, shady and damp places in search of their prey. This consists of the endemic Limnobiidae or daddy longlegs, which live in such places. On one occasion I saw a number of *Nesomimesa hawaiiensis* endeavouring to catch Fulgoroid leaf-hoppers, that were running on a small tree-trunk, but they were quite unsuccessful in their attempts, the hoppers when pounced upon always hopping off in safety. Although I have often watched females of these wasps returning with prey to their burrows, it was always Tipulidae that they carried to the nest. Their burrows are usually made in the ground and are often drilled down from beneath a stone, this no doubt serving to keep the burrow sufficiently dry. Sometimes numbers form their burrows close together and I have found such colonies of *Nesomimesa* and *Deinomimesa* mixed, a favourable slope and soil attracting both alike. On a few occasions *Nesomimesa* has been observed to form its nest in tree trunks, probably utilizing the boring of coleopterous insects.

The parasitic Chrysididae, which so often attack Pemphredonids in other countries, are wanting in our fauna and, so far as is known, the Hawaiian Mimesae have no parasitic enemies. On one occasion I took the male of *Nesomimesa nitida* from the stomach of a thrush (*Phaeornis*) on Lanai. The comparative scarcity of prey appears quite sufficient to prevent their becoming more numerous than we find them, in fact one is rather astonished that they can procure sufficient to become so common as they are.

Excepting *Nesomimesa nitida*, which is found on each of the three adjoining islands Maui, Molokai and Lanai, all the species of the genus and *Deinomimesa* are confined each to a single island. The latter genus is at present unknown on Oahu, Molokai, Lanai, but has two species on both Kauai and Hawaii. *Nesomimesa* has two species on Kauai, and one on each of the other islands.

CRABRONIDAE.—The Hawaiian Crabronidae are represented by 18 described species, which I have distributed in five genera. All these forms appear to be closely allied and, as it appears to me, might well be the descendants of one original immigrant form, allied to *Crabro vagus*. To this latter there are closely allied species in China and America, and for this reason the Hawaiian forms may be either Asiatic or American in origin. The Australian forms are very different. Of the 18 species represented, three represent each one a distinct genus, while another genus, *Nesocrabro*, contains four species, so that the greater part of the known forms fall into one genus, *Xenocrabro*, of which the others appear to be simply derivatives, and it is to species of *Xenocrabro* that the European *Crabro vagus* is most nearly related.

Unlike the other endemic fossorial Hymenoptera (*Nesomimesa* and *Deinomimesa*) the Hawaiian Crabronids are ubiquitous, occurring both on the coast, in open mountain localities and in thick forests. Some species indeed, e.g. *X. unicolor*, occupy all such stations, and I have found this to occur in wetter and denser forests than any other wasp, and where only a few species of bees otherwise represent the aculeates. Many of the species are extraordinarily numerous in individuals, and we have seen around a dead cow, on which flies were abundant, a swarm of one or two species of *Xenocrabro* almost as large as that of their prey. I several times noticed when I had shot a deer on the island of Molokai, that one or more Crabronids would arrive and settle on the body before this was even cold, awaiting the arrival of flies. One may well suspect that at the present time the number of individuals of these wasps is much greater than was the case under natural conditions of the fauna, unless, indeed, the endemic Dipterous population has very much changed. The swarms of dung- and carrion-eating Diptera, that now exist in the mountains, can have had no place in the original fauna, and on many of these flies the wasps now largely prey. Even the common house fly is not exempt, and at the Volcano-house hotel on Hawaii *X. atripennis* has often been seen entering the room and taking the flies on the window panes. If we consider such flies as *Sarcophaga pallinervis*[1] (described from the islands) to be endemic, even these can now breed in numbers previously impossible, owing to the great number of cattle that have been introduced, and furnish food for their larvae. Another favourite prey of the Crabronids of to-day consists in two common species of parasitic Tachinid flies, both foreign.

The natural prey of the species of *Nesocrabro* is certainly the remarkable and comparatively rare Sarcophagid flies of the endemic genera *Dyscritomyia* and *Prosthetochaeta*. They have several times been caught, when carrying these, and a burrow of *N. stygius*, that was opened, was found to be packed with a small species of one of them. We have taken the same flies from nests of other of the Crabronid genera, but they are not restricted to these. *Hylocrabro tumidoventris* sometimes provisions its cells with a moderate-sized species of *Drosophila*. Some of the smaller species of *Xenocrabro* are fond of preying on the Anthomyiid *Lispe*, and we have found others carrying species of *Caenosia* of the same family, all these being endemic species. One species of the wasp by no means restricts itself to one kind of prey, nor even always to kinds at all similar, for *Xenocrabro hawaiiensis* on one occasion was caught carrying off *Lispe* and on another occasion a species of the Limnobiid *Dicranomyia*! This fact is of some interest, because the latter is the habitual prey of *Nesomimesa*; and it shows that the Crabronid can successfully capture the same without the aid of special apparatus. *Xenocrabro unicolor* has been seen to capture and carry off the recently introduced and showy *Neoexaireta spinigera*, a Stratiomyiid. The burrows of the Hawaiian Crabronidae are usually formed in the ground; those of *Nesocrabro* have been found only therein. Others sometimes burrow in dead tree trunks, using, in harder woods, the borings of xylophagous beetles. *Hylocrabro* often makes its cells in soft rotten wood of such trees as the Kukui (*Aleurites*) or the Hau (Hibiscus). Some of the species visit flowers, e.g. *X. distinctus* and *X. mandibularis*, on the coasts of Oahu, Maui and other islands. In the mountains they are sometimes attracted numerously by the flowers of *Wikstroemia foetida*, and also those of *Metrosiderus*. In general, however, they are observed flying round and settling on the leaves of bushes and ferns in the sunshine. The females penetrate into dark shady places, so dark that they can hardly be seen, in search of prey. Some of the species of *Nesocrabro* emit a shrill noise, when on the wing, which much resembles the note of the Tachinids they are seeking.

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[1] This species is now known to be American.

The series of species represented in the islands exhibits a great variety in appearance, for some of them are much and conspicuously marked with yellow on all parts of the body, the yellow markings becoming reduced in others, until in *X. unicolor* we have an entirely black insect.

There is in the yellow-marked species much variety in the coloration, and the variation exhibited is often of an interesting character. Many years ago Smith described a Hawaiian *Crabro* as *C. distinctus*, from a specimen brought back by the old Beechey expedition in the early part of the last century. Smith's description, dealing mainly with colour, seemed to me to represent an insect so different from any Hawaiian Crabronid, that (in the absence of the specimen, which could not be found) I suspected a mistake had been made in the locality, and omitted the species from the Hawaiian list. *C. distinctus* is now well known to me, and is an extreme and rare variety of the species I called *C. notostictus*, which typically is a black insect, with small yellow thoracic markings. Intermediate specimens between the extremes are much commoner than typical *distinctus*. This brightly marked form has so far only been found at or near the coast, where the intermediate forms also occur, as well as the variety I called *notostictus*. In the mountains in the forest region the latter is predominant and intermediates are rarely met with. From these facts one might suspect that the hot dry climate of the coastal regions was productive of the conspicuously marked varieties. The following considerations make such an explanation improbable. In the genus *Nesocrabro* I described a species, gaily marked with yellow as *N. bidecoratus*, adding a remark to the effect that "In spite of its extremely distinct appearance I suspect it may prove to be a variety of the following" (*N. rubrocaudatus*). This now proves to be the case, intermediate varieties having been secured. The variation in this case is even more extreme than in the other, since typical *rubrocaudatus* is an entirely black-bodied insect, whereas the var. *notostictus* of *distinctus* has at least yellow thoracic markings. It is interesting to observe that the markings of the most highly coloured *N. rubrocaudatus* (var. *bidecoratus*) almost entirely resemble those of *Xenocrabro distinctus*. Looking at the localities, where these brightly marked varieties of *Nesocrabro* occur, we find that, far from living in hot and dry places, they are found in the wet woods near Kilauea (4000 ft.), in the still wetter district of Olaa and other localities of windward Hawaii. I think that these highly coloured varieties are 'reversions' to an ancestral style of coloration, and I believe this is borne out by an examination of the varieties of other Hawaiian species. In these there is a general tendency to blackness of coloration, some few retaining conspicuous yellow markings, while most have these reduced to inconspicuousness or they are entirely absent. *Xenocrabro hawaiiensis* and *fulvicrus*, *Oreocrabro abnormis* and *Hylocrabro tumidoventris*, species with normally black abdomen, all become spotted, as exceptional and sometimes very rare varieties. Species like *Nesocrabro stygius* and *daemonius*, with immaculate abdomen above, frequently retain yellow pigment spots beneath, where they are concealed from view. Generally speaking yellow markings, especially thoracic, are less easily lost in the female than in the male. The general blackness of the Hawaiian Crabronids, as now manifested, has I think been produced within the islands, and while some still retain more or less the colour of their ancestors, the majority have greatly departed therefrom, though many of them in exceptional individuals reproduce that coloration to a greater or less extent. Further, a study of the case cited of *Nesocrabro rubrocaudatus* and *Xenocrabro distinctus* lends strong confirmation to the community of descent that is suggested by the consideration of their structural characters. At least I find it difficult to understand how two species of these distinct genera can, under totally different conditions of climate and environment, produce remarkable colour varieties, totally dissimilar to their usual forms, yet almost identical with one another, unless they be reversions to a former style of coloration.

As in the bees, Hawaii is also the richest island in its Crabronidae, seven species occurring there, of which five are apparently endemic and one of the others is almost specifically distinct (*H. tumidoventris* var. *leucognathus*). Maui has six species, but only one is peculiar to it, whilst Molokai and Lanai have none endemic. Oahu, like Hawaii, has seven, but only three are peculiar to it. So far as yet discovered, however, it alone possesses the remarkable genus *Oreocrabro*. Kauai is poorest of all, with three species only, two of which, *Nesocrabro compactus* and *Xenocrabro monticola*, both occur on Oahu (the former also on Lanai and possibly other of the islands) and one only peculiar to itself, *X. affinis*. These statements are likely to need modification hereafter, but are based on the information accessible at the time of writing. They do not accord with the facts given in 1899, as might be expected.

No parasites are known to attack the Crabronidae of the islands, though it is quite likely that the Chalcidoid Encyrtidae may do so, nor did I find any specimens of them in the stomach of the many birds that I dissected. They have a peculiar odour, like members of their family in other countries.

TRYPOXYLONIDAE.—A family of little importance in our fauna, the Trypoxylonidae are represented by a recently introduced species of *Trypoxylon*, a native of China, occurring also, I believe, in tropical Queensland, and by three species of *Pison*, of the sub-family Pisoninae. One of these is of quite recent introduction, having become noticeable in Honolulu in 1903, but was not taken in 1900, when I collected a number of specimens of the other two species in gardens there. This recently introduced species now far outnumbers the other two combined, in Honolulu. It has different habits, in that, instead of nesting in burrows or cavities in woodwork, it forms mud-cells like those of *Sceliphron*, fixing these under ledges and on the walls of wooden houses, etc. The other two *Pison* are older introductions, both having occurred at Blackburn's period of collecting; both are apodemic and of Australasian origin. All the species, like *Trypoxylon*, store their nests with spiders. It is perhaps worthy of note that the *Trypoxylon* was introduced first into Hawaii, and not through the port of Honolulu, as has usually been the case with imported insects. It did not reach Oahu until some years after it had become widely spread and abundant on the large island.

SPHEGIDAE.—Represented only by the imported American *Sceliphron*, an universally distributed species in the islands, from the coast to 2000 ft. and sometimes higher elevations. It varies much in colour, as is the case in its native home. It is an injurious species, in that it disfigures the walls and ceilings of houses with its large masses of mud-cells. In the country these mud-cells are placed on rocks and trees, and whether in the houses or outside are frequently occupied by the introduced *Pison* or the endemic *Odynerus nigripennis*, more rarely by other species, as nests for their young. On Kauai *O. radula* also occupies the disused cells of *Sceliphron*.

EUMENIDAE.—This family is represented by a greater number of species than any other of the indigenous Hymenoptera, and all, to the number of 102, belong to the ubiquitous genus *Odynerus*, *sensu latiori*. From this interesting complex I have split off some small groups of species and considered them as distinct genera, as indeed they are, although they appear to be derivatives of the same stock, as the Hawaiian *Odynerus* proper. *Odynerus nigripennis* and its three allies are of different descent from that of all the others, and certainly are sprung from a quite different[1] ancestral immigrant. If the classification of the *Odynerus* of the world were not in a chaotic state, these four species would not be placed in the same genus as the others, and a number of genera or sub-genera, allied to one another, would also be formed for the dispersion of the bulk of the Hawaiian species. One might reasonably compare the Hawaiian series of *Odynerus* with that of the Nitidulidae in beetles. Though the known species are less numerous, and the specific characters much more distinct, they form a somewhat similar series of generic or sub-generic groups. The preciseness of the specific characters is itself an interesting fact, almost indeed unique in our Fauna, when large genera like *Odynerus* are in question. I think this distinctness of the species is quite real, and not at all due to the fact that the *Odynerus* have probably had more time given to their study than any other large genus of the Hawaiian insects. It is sufficiently proven by the fact that, except in a few special cases, the species have been accurately determined from my tables by those who either have had no previous knowledge of Hymenopterous, or even of any insect characters, after a very small amount of study. I do not think that any such result is possible with most other large Hawaiian genera (or groups of allied genera) such as are found in the Carabidae, Anobiidae or Nitidulidae for instance.

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[1] No doubt Asiatic; since allied Japanese species exist.

The *Odynerus nigripennis* group is probably of Asiatic origin, and I suspect is an ancient or primitive type, showing some affinity to the genus *Rhynchium*, in which the species above mentioned was originally placed by Holmgren.

Species of *Odynerus* are almost ubiquitous throughout the islands, though some of the densest and wettest boggy forests are absolutely devoid of them. At the same time a slight change in these, made by the incursion of cattle, is sufficient to allow of some species becoming established, where previously they could not exist. A minority of the species such as *O. nigripennis*, *O. obscure-punctatus* and others can occupy most diverse stations, from the coast to the region of frequent frosts in the high mountains. Some others thrive equally on the coast or in open areas in the forest region, or above the forest, but not in the thick forests. On Hawaii some of these pass from above the forest to the lowlands through the midst of the densest woods by means of the almost bare lava flows, by which the woods are intersected, but do not enter the forest on either side of the flow. Some, like *O. nigripennis*, are not affected by the diversity of station occupied, but others, like *O. scoriaceus*, have a tendency to local variation in colour, when subject to great difference of climate. Many of the species are true forest insects, some being confined to the drier and more open woods, others are only found amongst denser growths, with heavier rainfall. Some species occur high above the forest limit in the region of frequent frost, and of snow in winter time. Many are fond of frequenting the rocky mountain streams, not only for the purpose of drinking the water, but because they are enabled in dry weather to find there earth sufficiently moist for forming (in some species) or for closing their cells. At one time when camping on Maui at an elevation of about 9000 ft., where owing to the black lava sand and the bright cloudless sky the heat was intense by day, though below freezing point at night, it was interesting to watch two or more species of *Odynerus* visiting one of the water-holes, situated in so perfectly shaded a spot, that the water retained an icy coldness. After a copious drink of this water, each wasp would fall into a state of complete insensibility by the side of the water-hole, and as many as a score were observed in this torpid condition at the same time. After a considerable period, sensibility would return, and the wasps fly off without apparent injury.

In the forests these wasps are frequently taken on flowers, especially those of *Metrosiderus*, but they have been noticed on many other native trees. In general, however, they will be observed flying round foliage of trees and ferns, the females more slowly, while seeking for their prey, the males more wildly, in search of their females.

On the coast and lowlands they visit exactly the same plants, as I have mentioned in the case of the endemic bees (*Nesoprosopis*). In places where they breed some may be observed in the greatest abundance flying about rocks, especially where these are piled up to form rough walls, up and down which they are continually coursing.

Their choice of nesting places is very varied. Some (like *O. sociabilis*) burrow in the ground, especially in dry sandy lava. Others always form their burrows in dead tree trunks, and many (e.g. *O. obscure-punctatus*) are indifferent, breeding freely in posts and dead tree trunks, or in the porous cavities of lava rock, which latter appear to be the sole or chief nesting place of others. *O. nigripennis* and the allied *O. radula* occupy all sorts of nesting places, such as all those mentioned, and often the empty mud-cells of *Sceliphron*. These and others (e.g. *Nesodynerus rudolphi*, *O. montanus*, *hiloensis*, etc.) freely enter the verandahs and even the rooms of houses, where they make their cells in cracks or holes in furniture, in the cavities of bamboo, and other situations. *O. nigripennis* is so common about many houses, that it cannot fail to be often carried on ships with furniture, from one island to another. It has been taken as single specimens on Kauai, but whether it is really established there, I do not know. A few species, *Odynerus oahuensis* being one of these, have abnormal nesting habits, forming complete mud-cells, which are attached to the leaves of trees or to other objects. They are generally placed in sheltered situations, sometimes for example in a curled up leaf of *Pelea*, wherein a spider has made its nest; and as various other creatures, including young mollusca, seek the same shelter, we have several times found quite a collection of animals around the wasp's cell. On one occasion this wasp was watched bringing caterpillars to store an open cell, which was (with several already completed) suspended from the rootlets of a large fallen Ohia tree, bridging a small mountain stream. On other of the islands, where *O. oahuensis* does not occur, similar nests have been found, but the makers have not been identified.

The prey of Hawaiian Eumenidae, so far as is known, consists entirely of caterpillars. The number of these contained in a single cell varies according to the size of the species of wasp and according to that of the size of the caterpillars. A large variety of caterpillars are employed, and a single species of wasp is not only not constant to the use of one kind of caterpillar, but sometimes even mixes the species in a single cell.

On the whole it may be said that Pyralid and Microlepidopterous caterpillars are the favourite prey and that Geometridae are rarely utilized. It is most remarkable, seeing that the latter are occasionally taken (e.g. by *O. montanus*, *eucharis*, etc.), that this should occur so rarely, for the Geometrid caterpillars are so very numerous that they could be often obtained in any quantity. It is amusing to watch the common *O. nigripennis* hunting the caterpillars of *Omiodes*, which shelter themselves by spinning together the leaf or leaves of their food-plants. On Molokai a large 'wiliwili' tree (*Erythrina*) was the home of hundreds of the caterpillars of *O. monogona* and was constantly visited by the female of this wasp. She would keep running from one end to the other of the gallery of the caterpillar, as the latter retreated to and fro, until perhaps after dozens of these pursuits, the prey would drop down into the herbage below, to be at length found, stung into paralysis, and carried away to the cell. Several species of the wasps have been seen to carry off the grass-eating enemy of sugar-cane, *O. accepta*, and *O. epipseustes* preys on that of *O. continuatalis*. In fact no doubt almost any *Omiodes* caterpillar is acceptable to many of these wasps, for we have seen them visiting the plants of *Astelia* near the volcano at Kilauea in search of the species that feed on these. Of other Pyralid caterpillars various species of *Phlyctaenia*, *Pyrausta litorea*, and others, *Mecyna*, and the foreign *Hymenia recurvalis* are all well-known prey, so that it is probable that most Hawaiian species of this group fall victims on occasion. Of smaller moths the caterpillars of Tortricidae and Carposinidae are favourites.

It is a common sight to see *Nesodynerus rudolphi* and other species that are common on the lowlands, extracting the larvae of *Crocidosema plebeiana* from the flower-buds of *Sida*; in fact this Tortricid now furnishes an important food-supply of the larvae of various littoral and sub-littoral species of wasps. In the mountains *Eccoptocera foetorivorans* is a common prey. Besides these and other Tortricids, endemic and foreign, and various Carposinidae of the genus *Heterocrossa*, members of the Tineina are also preyed upon, e.g. the Gelechiid *Thyrcopa*, as well as introduced forms. With this range of choice in the nature of the prey, the number of caterpillars stored in a cell varies very much; over thirty of a Carposinid or small Tortricid (I failed to note which) were once found in one made by *O. oahuensis*.

In many localities at favourable seasons the number of individuals that are seen is extraordinary. On one occasion I visited a mountain gulch on Molokai nearly every day for three weeks and I estimated that in a length of a couple of miles (below the line of forest) the population of adult wasps in this length was at least one million. Five or six species were represented, but two or three were much more numerous than the others. I have noticed an almost similar abundance in other localities. As may readily be imagined, the economic value of these wasps is consequently very great. This is the more true, since they readily prey on the most injurious imported Tortricines, such as *Archips postvittanus* and other harmful caterpillars. It is probable that very few of the large number of species existing are really rare, though of some only a few specimens or even single examples have been taken. The Oahuan forms have been much studied, and the only one that has been found once only is *Nesodynerus optabilis*, and it must be remembered that the general appearance of this insect is exactly that of several of its commonest allies, so that it may readily be passed over. Excepting the littoral or sub-littoral species and the one just mentioned, every known Oahuan *Odynerus* has been found in the mountains within three or four miles of Honolulu itself, as one might say in one spot. Some, however, are of course much rarer than others, and their apparent rarity is increased by the fact that, like Aculeates in other countries, they are much rarer in some years than others, and further they appear at irregular times, so that a species may be abundant one year in March for instance, and another year in August, and in some years may hardly be seen at all. Consequently during any year unless one is constantly collecting at all seasons in a fixed locality one may easily miss the period of greatest abundance of any species or fail to find it at all. With experience and close attention in the field it is fairly easy to discriminate between species that are exactly alike superficially, owing to indescribable differences in appearance, often due to mode of flight and posture.

Only in exceptional cases do the Hawaiian Eumenidae exhibit important variation, and in very few cases is this more than of a trifling character, affecting the colour. There is, however, great variation in the size of individuals of a species, and this is due usually to the amount of food supplied to the larva, but sometimes to the fact of two eggs being laid in a single cell, so that the food supplied normally to one, has to nourish two larvae. To this constancy of structure is partly due the ease with which the many species can be discriminated. A common variation, which occurs again and again and in the most diverse species, is the occasional assumption of a feeble yellow band or traces of such a band on the first or first two abdominal segments in species which typically have an entirely black body. Examples of this are *Nesodynerus rudolphi*, *Odynerus venator*, *O. heterochromus*, to instance only species very widely separated in structure. Sometimes the yellow band appears only on the ventral surface. The phenomena are precisely identical with those observed in the Crabronidae, and I think are explicable in the same way. The blackness of so many Hawaiian Eumenids has been produced in the islands, and the abnormal individuals are reversions to a former general condition in colouring. These too, like the Crabronids, have retained in some species the original yellow-banded colouration.

The general tendency to blackness of the Hawaiian Aculeata as a whole is one of their most remarkable features. The blackness of these insects is increased by the dark colour of their wings, which in a large number of the species exhibits striking blue or purple reflections. The result of this is to produce a great superficial resemblance between many of the bees, wasps and fossorial wasps. Though similar phenomena appear in the Aculeates of other countries, I know no case quite comparable in extent with that observable in this fauna. We are not able to suggest any satisfactory explanation as to the cause of this widespread melanism. Were it universal it might certainly be considered protective, for the result is conspicuousness, but the allied species that lack the blackness thrive as well as those that possess it.

If we now return to the consideration of the Eumenidae by themselves, we again find most interesting facts in connection with their colouration. It may be said in brief that the Hawaiian *Odynerus* (s.l.) have become divided up into a number of colour groups, and that these are entirely different from groups based on structure and real affinity. As these colour groups occur on each island, and some of them indeed are only found on one of the islands, we may review the species on each island separately.

On Kauai are two colour groups, one of which contains only two known species.

GROUP I.

Insects with much red marking, wings shining fuscous, when spread.

O. blackburni and *soror,* allied species.

GROUP II.

Black insects with two conspicuous whitish or yellow bands on abdomen; wings dark and with conspicuous blue or purple reflections. Fourteen species of diverse structure. (Plate XVI, fig. 1.)

On Oahu are four colour groups, two of which may be said to be peculiar to this island.

GROUP I.

Black insects with dark wings, showing conspicuous blue or purple reflections.

O. nigripennis, *epipseustes*, *erro*, *iopteryx*, *montanus*, *konanus*, *unicus*. *Nesodynerus optabilis*, *rudolphi*. (Plate XVI, fig. 3.)

GROUP II.

Generally small species, black with shining fuscous wings, no blue reflections. In this group some species show feeble and variable pale abdominal bands, and others some red markings, apparently tending to disappearance and not conspicuous.

O. dubiosus, *threnodes*, *pterophaennes*, *waianaeanus*, *paludicola*, *paranaias*. *Nesodynerus oblitus*, *acyanus*. (Plate XVI, fig. 4.)

GROUP III.

Insects usually much marked with red, and the body with appressed fuscous tomentum. Wings to a large extent hyaline and with no blue reflections.

O. pseudochromus, *pseudochromoides*, *leiodemas*, *homoeophanes*, *eucharis*, *oahuensis*. (Plate XVI, fig. 2.)

GROUP IV.

Insects with usually two pale abdominal bands, the wings more or less infuscate and with blue reflections, body generally with pale tomentum.

O. xerophilus, *nautarum*, *acoelogaster*. *Pseudoptero-cheilus relictus*.

On Maui, Molokai, and Lanai, the fauna of each of which is largely the same, we have three groups.

GROUP I.

Identical with I on Oahu.

O. nigripennis, *purpurifer*, *instabilis*, *ecostatus*, *laevisulcatus*, *camelinus*, *brevicostatus*, *aprepes*, *lanaiensis*, *konanus*. *Nesodynerus eupteryx*, *paractias*. *Pseudopterocheilus congruus*. *Chelodynerus chelifer*.

GROUP II.

Identical with IV on Oahu.

O. molokaiensis, sociabilis, smithii, insubicola, nubicola nivicola.

GROUP III.

Insects with red thoracic or abdominal markings or both, the wings dark and with blue reflections.

O. frater, monas, cephalostictus, naiadum, tempe, dryas, potamophilus, microdemas, monobius, erythrostactes, montivagus, sandwichiensis, petrobius, deinogaster, homoeogaster. (Plate XVI, fig. 6.)

On Hawaii there is a general tendency of the above three Maui groups to become fused into one large group, all representing I. *O. obscure-punctatus* and *rubropustulatus* and one or two others may be recognized as obscure members of Group III. *O. newelli, sociabilis, scoriaceus,* represent II.

Speaking generally of these groups, I find that in the field, the members of each are easily enough distinguished. There are, as might be expected, some cases of species that are intermediate in appearance and which might be placed in either of two groups, but these are very few. On Kauai Group II stands out remarkably from all others, since nearly all the Kauai species belong to it, while it is only approached in appearance by a few species in Group IV on Oahu. The tendency of the species to become red-marked on the intermediate islands is very striking, nearly half the known species being so coloured.

Group IV on Oahu (= Group II of Maui, etc.) is not very clearly marked off from its Group I, when the insects are seen in flight, but as they usually have a characteristic grey or hoary appearance they may be kept apart, especially as they represent species mostly peculiar to open country or open spaces in forest country. When their representatives on Hawaii are considered, they become much less distinct from those representing Group I on that island.

Groups II and III on Oahu are peculiar to itself, the dull red markings, clear wings and body clothing of the former giving its members, dead or alive, an appearance unlike anything else, while the shining fuscous wings of the latter render that group equally unmistakeable.

In a few cases, isolated species have been found on islands, where they ill accord with the groups there represented, but one cannot overlook the probability of these being recent immigrants. Thus *O. frater*, a widely distributed species, has been found very rarely on Oahu, where it does not fit into any colour group, as it does on Maui, where it abounds. Excepting on Kauai, the Group I of Oahu is well represented on every island, besides tending to absorb all others on Hawaii, so that nearly half the known species of these wasps may be referred to it. The dominance of this group increases the blackness of our series, for it contains species almost or entirely black and with dark iridescent wings; and, when other groups of Hymenoptera are considered, is swelled by species of bees, of fossorial wasps, and even of parasitic Ichneumonoids.

It is clear that the colour phenomena exhibited by our Hawaiian Hymenoptera are similar to those seen in other countries (whether in the Hymenoptera or in other orders) where such colour groupings are explained as being associations of inedible species, which are easily recognized by predatory enemies from their similarity of colour. Whether this explanation is true in the Hawaiian case is, I think, very doubtful, though I do not doubt that a satisfactory explanation of this would also explain the others. The Australian Eumenidae, Prosopidae and Fossorial wasps furnish instances very similar to the Hawaiian, and in the same groups, as I have myself observed in the field, in that country. I feel considerable difficulty in the existence of four well-defined colour groups, the members of which more or less intermingle in locality on the small island of Oahu. Were each of these groups composed of members the most closely allied structurally to one another, the difficulty would appear less; but it is far otherwise, for the species of the distinct genus *Nesodynerus* are divided amongst Groups I and II, containing structurally diverse forms of *Odynerus*, and the remarkable Group III contains three quite different structural groups of the latter genus. On one occasion all the six members of this group were taken in the same spot and on the same day, and it is common to find two or three of the species flying in company, the number of individuals of each species varying according to place and season. In all the groups some of the species are always very much less numerous in individuals than others. Instead of becoming split up into four colour groups on Oahu alone, one would have supposed that it would have been more profitable and easy for one group only to have formed, as being more easily recognized. As it is, one certainly cannot say that one of these groups is more successful than another, for each contains extremely common and comparatively rare species. It may be noticed that, excepting two species (hardly to be reckoned as forest-insects, being probably recent derivatives from very similar forms on other islands) the Kauai wasps have practically become superficially all alike, and, as has been remarked, there is a strong tendency in the direction of a single colour group on Hawaii.

If we assume that these colour groups are formed by processes of natural selection and are indicative of inedibility, we are perplexed as to the immunity of insignificant forms, which do not attain notably iridescent wings or any markings, and yet fly around in company with these others and are equally or sometimes even more plentiful. For if these are successful, why should colour groups occur at all? It is fair, however, to say that the one instance in which an aculeate was taken from the stomach of a bird, was that of a diminutive male of *Nesomimesa*, one of the most inconspicuous forms, extracted from the thrush *Phaeornis lanaiensis*. It should be added that the writer collected series of nearly every land-bird on each island, and so was able to examine the stomach contents of a large number of birds in all, and the finding of a solitary

Mimesa only, would not tend to show the Hymenoptera, as a favourite food, in any shape or colour. As a matter of fact, an Aculeate Hymenopterous insect (with rare exceptions) is so unlike that of any other order by its general appearance in life, that one can hardly imagine any vertebrate enemy with sense enough to distinguish between colour groups of these and without the sense to distinguish the class as a whole. If colour groups in Hymenoptera have arisen as a mark of inedibility, the latter quality can I think have nothing to do with the possession of a sting.

At one time I supposed that the Hawaiian colour groups might be the result of the action of climatic differences, at least in so far as these groups were special to certain of the islands. This seems very doubtful, for we find the nearest approach to the colour group of wasps living in the forests of Kauai, in those living on the driest coasts of Oahu, and quite absent from its very similar forests. In fact a satisfactory explanation of the colour groups of Hawaiian Hymenoptera is wanting, and, when found, will no doubt explain some of the similar phenomena elsewhere.

It is interesting to trace the structurally allied forms on different islands and see how their superficial appearance is changed by entering different colour groups.

Odynerus eutretus of Hawaii is a black insect with dark blue-iridescent wings; on Maui it is represented by *O. homoeogaster*, a red-marked wasp; on Kauai by *O. mimus*, a conspicuously white-banded species. The *obscure-punctatus* group on Hawaii is replaced by the redder species *O. sandwichiensis* and its allies on the intermediate islands; on Oahu the blue iridescence of the wings is lost as well as all the red markings (*O. dubiosus* and allies), while on Kauai the red markings remain, but the wings are of a shining fuscous (*O. blackburni* and *soror*) as in the Oahuan allies. *Odynerus nigripennis*, ubiquitous over all the other islands, is replaced on Kauai by the banded *O. radula*.

From what has been said above, it appears that Hawaiian *Odynerus* have little to fear from vertebrate enemies, but in all localities (more or less), at times, a failure of food supply occurs. This is of course most marked in dry coastal districts, where, in some unusual seasons, vegetation never advances sufficiently, for a whole year or more, to furnish food for the caterpillars, which are the prey of these wasps. The same climatic causes, however, which retard the emergence of the Lepidoptera, until suitable weather returns for the growth of the food plant, cause the *Odynerus* to lie dormant in the larval stage and await the same conditions before pupation takes place. But for this, many of the littoral species would, no doubt, be quickly exterminated by occasional unusually dry seasons. The larvae of the *Odyneri* are attacked by a minute Mirine Encyrtid of the Chalcid series, and since such different species as *O. nigripennis*, *montanus* and *oahuensis* have been found to be destroyed, it is quite likely that many others are subject to its parasitism. This parasite was not noticed until 1901, when it was bred from *O. oahuensis* from the Makaha valley, but there is no good reason to suppose it to be of recent introduction, as up to that time few *Odynerus* had been bred.

It is now probably of universal distribution over the islands. Scores of individuals emerge from a single wasp-larva. Doubtless the anomalous, polyphagous Eulophid genus *Melittobia*, now present in the islands, will be found to attack many *Odynerus*. Though not noticed in Honolulu till 1903, in 1906 it was already found far in the forest on Hawaii at Kilauea. It is not yet certain whether it is an importation, but it probably is so. The wood-boring species of *Odynerus* and the builders of mud-cells (*O. oahuensis*) are parasitized also by *Eupelmus*, but whether those that burrow in the soil are similarly attacked is not known.

In spite of the fact that the island wasps are insects of strong powers of flight, and further that many form their nests in dead branches or trunks of trees, and even in some cases in those light-wooded trees, which frequently are conspicuous in the inter-island drift, yet they are quite remarkable for the large percentage of species peculiar to a single island, or, in the case of Maui, Molokai, and Lanai, to a group of adjoining islands.

Thus all the species known from Kauai are peculiar to it, excepting that isolated specimens of *O. nigripennis* have been once or twice found there, probably imported with furniture from Oahu. The latter species is ubiquitous throughout the other islands, and *O. frater* and *O. konanus*, though they are much less numerous than *nigripennis*, occur on all these. Apart from these three, Oahu has 25 species, all peculiar, except that one has once been recorded from Maui, perhaps wrongly. The three neighbouring islands Maui, Molokai, and Lanai, in addition to the three species above named, have two only (*Chelodynerus chelifer* and *O. sociabilis*) identical with Hawaiian species, leaving thirty peculiar to them.

Kauai, with all its species endemic, is far poorest in the number of known species, only seventeen having been described, Oahu the island nearest to it having no less than 28.

As the *Odynerus* (s.l.) are so easily collected, more accurate figures can be given as to the endemicity of the species of each island, than is possible with most Hawaiian insects. No doubt the figures are subject to alteration, but probably the percentage of endemicity will not be greatly affected. It is therefore worth while to tabulate the facts, as they exist according to my present information.

Island	Species found on	Species endemic on	Percentage of endemic
Kauai	17	17	100
Oahu	28	25	89
Maui, Molokai and Lanai	35	30	85
Hawaii	32	27	84

The close relationship between the three intermediate islands (here treated as one) is seen from the fact that the insignificant island of Lanai, with some ten species of *Odynerus*, has apparently nothing endemic, its most distinctive forms being only small colour varieties of those known from Maui or Molokai or both.

The percentage of endemicity of species on the islands, excluding Kauai, is, as shown above, extremely close, and, as more new forms are likely to be found on the other islands than on Oahu, this percentage may become still closer.

VESPIDAE.—The three species of *Polistes*, two of them introductions from China, viz. *P. hebraeus* and *P. macaensis*, and one from California, *P. aurifer*, are all very abundant insects. *P. macaensis* and *aurifer* were present in the islands more than thirty years ago, but *P. hebraeus* is of later introduction and was not generally distributed over the islands in 1892, nor did it reach Hawaii till some years later still. Although treated as varieties by most authors, *P. macaensis* and *hebraeus* are quite distinct by the different processes of the sixth ventral segment of the male abdomen. The *Polistes* are now nearly ubiquitous, from the coast to six thousand or more feet above the sea. On the central plateau of Hawaii I have noticed nests built in the bleached skulls of cattle and sheep, that are thickly spread in some parts of that desolate country. These wasps are beneficial in destroying numbers of harmful caterpillars, but are otherwise a nuisance. They are affected by the Stylopid parasite *Xenos*, and the Pyralid moth, *P. mauritialis*, breeds in the nests.

BETHYLIDAE.—The species of *Scleroderma* present feeble specific differences, so that the number recorded (10) is subject to change, for little is known as to their variability, etc. We have, however, noticed in bred examples of one species a very decided individual variation in the shape of the propodeum, an important character. Their habits are not well known. One or two species have been bred from dead wood, yielding various beetles (Anobiidae, Cioidae, Cerambycidae, Proterhinidae) and Tineid Lepidoptera mixed, and the possibility of other insects being represented, but failing to emerge, is, of course, great. It is, however, known that one or two of our species attack Microlepidoptera, so probably many have this habit. Male examples are very rarely met with in the field and not often bred, so that it is probable that *Scleroderma* like the apterous females of Dryinidae are often parthenogenetic.

Sierola differs greatly from *Scleroderma* in the fact that while individuals of the latter are not generally common, those of the first genus are quite the most plentiful of the parasitic Microhymenoptera. They are essentially forest insects, though one or two of them are occasionally found without the forest. Their habits are quite different from those of *Scleroderma*, for they are commonly seen running on the leaves of the 'Ki' (*Cordyline terminalis*), of *Pelea*, *Acacia koa* and many other trees and shrubs. They are parasitic on various caterpillars, but chiefly, I think, those of the Microlepidoptera (Tineina and Tortricina) from which I have occasionally bred specimens, but they also attack those of larger moths, for Swezey has bred *S. dichroma* from the caterpillar of *Omiodes asaphombra*. A former remark of mine that *Sierola* was parasitic on *Cioidae* is certainly incorrect, and it was, no doubt, *Scleroderma* and not

Sierola, that I bred from dead wood attacked by these and other Coleoptera. The species of *Sierola* are apparently somewhat variable and not always easily distinguished, and I rather suspect that they were more numerously represented in my collections, than is shown by Ashmead's discrimination of them.

These two genera embrace all the truly endemic Bethylidae, but in addition to these there have been described from the islands two semi-domestic species of *Holepyris*, as well as a species of *Sierolomorpha* (probably better referred to the Cosilidae). Of little importance, and at present undetermined, are a species of *Ateleopterus* parasitic on some of the insects (probably Coleopterous) that destroy stored seeds and grain, and a minute *Cephalonomia* that attacks the ubiquitous Scolytid, *Hypothenemus eruditus*.

Dryinidae.—This family is represented by a single species of the Australian genus *Echthrodelphax*, and one, or perhaps two, species of the widely spread genus *Pseudogonatopus*. The former is likely to be found elsewhere, being indeed extremely closely allied to an already known Australian species. It attacks Delphacid leaf-hoppers of various kinds, but apparently only on the lowlands or at low elevations, not being a true forest insect. The larval sac is placed beneath the lobe of wing or tegmen and a hopper frequently carries two of these parasites. In some cane-fields this parasite has reached extraordinary numbers at certain seasons, attacking the swarms of nymphs of the imported leaf-hopper of the sugar-cane. The larvae of *Echthrodelphax* like those of many other Dryinidae, are themselves attacked by chalcidoid parasites, which are almost certainly of foreign origin.

The Hawaiian representative of *Pseudogonatopus* is an anomalous representative of the genus and shows the most extraordinary variability in colour, some examples being nearly black, while others are quite pallid and in parts almost whitish. They vary both individually in one locality, and also very greatly, when taken in different localities. There are all sorts of intermediate conditions between the extremes. Ashmead recognized two species, but was doubtful as to their distinctness. *Labeo hawaiiensis* is the male of *Pseudogonatopus perkinsi*, the sexes having been bred several times. This Dryinid is found in the forests of all the islands, in very diverse localities, and attacking species of several genera of the endemic Asiracid leaf-hoppers. It is subject to the attacks of chalcid parasites of the Mirine group of the Encyrtidae, which attack its larvae, while still adherent to the leaf-hopper. Possibly owing to these parasites, the adults of *Pseudogonatopus* are less common than would be expected from the number of parasitized hoppers that are frequently seen. We have bred this insect from eggs laid parthenogenetically, although males appear to be constantly produced by the species.

Poneridae.—The exponents of the genus *Ponera* are no doubt introductions, excepting the forest-haunting *P. perkinsi*, which is rarely found on the lowlands. It lives in very small communities, usually of four or five to a dozen individuals, in woody places, where the ground is covered with dead leaves, or in more open places under logs or stones. It is often common under stones on the edges of the mountain streams. Throughout great areas of forest land, where the fauna is chiefly endemic, it is the sole representative of the Ants. It varies much in colour, and in some localities the majority of the individuals observed were conspicuously reddish.

The *Leptogenys* is possibly a natural immigrant, frequenting the lowlands and low mountain elevations. It nests both in tree trunks and dead wood, and in porous cavities of lava blocks. Its prey consists of Isopod Crustaceans, the remains of which are nearly always to be seen in heaps about or within the nest. It is fond of migrating from one spot to another, especially during the rainy season, and processions of these ants carrying their cocoons are a familiar sight in gardens in Honolulu. Sometimes we have found nearly every plant of a group of bananas to be occupied by colonies of the *Leptogenys*, these being disclosed when the leaves are stripped from the stem. No winged female has ever been found, though winged males are numerous. All the wingless examples are very similar, a slight difference in the length of the sting being the only distinction noticed between individuals. The winged male has, however, been taken in copula with one of these worker-like examples.

Myrmicidae.—This family is represented by a number of widely distributed or cosmopolitan forms of no interest in our fauna. I believe nearly all have been imported by man, and several new species have appeared since Prof. Forel's paper was published. Some of these ants are frequent inhabitants of houses, though they all flourish outside, e.g. *Pheidole megacephala*, *Monomorium vastator*, *M. floricola*, and *Cardiocondyla wroughtonii*, the latter breeding freely on some of the steamships plying between Australia and California, or Australia and Vancouver.

Cardiocondyla nuda is found in the mountains and on the coast alike. It is abundant in Honolulu, but was not collected by Mr Blackburn, so is probably of recent introduction. It varies a good deal in colour.

Solenopsis geminata and *Pheidole megacephala* have their nests infested by the Myrmecophilous cricket, *M. quadrispina*, and in that of the latter small Lepismidae are of frequent occurrence. Neither these nor the crickets, however, are confined to nests of these ants, for they equally infest those of some of the foreign Formicidae (*Prenolepis*).

Pheidole megacephala is the most abundant of all the foreign ants. In many parts it occupies not only the whole open country, but also the forests to a height of about 2000 ft. in the mountains. In open country it sometimes becomes established as high as 4000 ft., and may be numerous at three thousand. Usually, where forests are dense, it ceases to range above about 1200 to 1500 ft. of elevation, while in its range, no matter how fine or how dense the forest may be, the endemic fauna, save for a few forms, that can resist, or are tolerated by the ants, is entirely exterminated. This native fauna, especially of beetles, appears as if by magic, the moment the limit of range of *Pheidole* is reached. In some places on the coast there are localities so dry and hot that *Pheidole* cannot occupy them permanently, and here a remnant of a lowland endemic fauna persists, unsuitable as are the conditions for insects in general. Of the native insects that are attacked by *Pheidole*, the Aculeate Hymenoptera are the least injured. Even in the case of large Crabronids and wasps of the genus *Odynerus* it is common enough to find specimens with one or more workers of *Pheidole*, or with the great head of the soldier-form attached to their legs or antennae, and we have noticed instances where these strong insects have been entirely overcome by their assailants.

DOLICHODERIDAE.—Represented only by the introduced American form of *Tapinoma melanocephalum*. This small ant flourishes best in dry hot localities on the lowlands or lower mountain slopes. It is very common.

FORMICIDAE.—The three species of *Prenolepis* and one *Camponotus*, that represent this family, are no doubt introductions and of no interest. The latter is to a large extent domestic, breeding in incredible numbers in the walls of the wooden houses in Honolulu. In some of these (even in houses only a few years old) this *Camponotus* (*C. maculatus*) is an intolerable nuisance. Swarming takes place on dark still nights, when all forms of the ants issue from their nests, covering the floors, walls and tables and even entering the beds. Though partial to houses, *C. maculatus* thrives well enough in the open, but only on the lowlands, or at low elevations in the mountains. *Prenolepis sharpii* was imported in a box of plants from Hong Kong, the earth, in which the plants were sent, containing a great nest of this species, including hundreds of winged males and females. It quickly became naturalized.

CERAPHRONIDAE.—There are no endemic species in this family, but three species of *Ceraphron*, two of which have been described, are known to occur. All are found in Honolulu itself, and will no doubt become general in distribution. *Ceraphron abnormis* appeared in 1903 and subsequently became abundant. It is a North American species and has been swept from grass in California. Swezey has made known its habits, it being a hyperparasite of leaf-hoppers, through the Dryinidae, *Echthrodelphax* and *Haplogonatopus*.

SCELIONIDAE.—There are several species of the ubiquitous genus *Telenomus*, some being no doubt introductions, e.g. two that have been bred from the eggs of the foreign bug, *Rhopalus hyalinus*. Others, however, have occurred in the forest region and their habits are uncertain. One rather remarkable species is found numerously on Hawaii in company with Asiracid hoppers, a small Capsid and *Reduviolus*, and is likely to be parasitic in the eggs of one of these Hemipterous insects.

A species of *Baeus* is found in wet places in the mountains, and no doubt will be found to be parasitic in spiders' eggs, and could be bred from these. We have only found single specimens of this minute insect, and they are generally lost from being mixed up in the killing bottle with larger forms.

Two allied genera *Pseudobaeus* and *Dyscritobaeus* are described for insects occurring in gardens in Honolulu, where they frequent foreign grasses in company with apodemic insects, such as *Reduviolus capsiformis*, *Orthoea vincta*, etc., but their habits are not known. They are most likely parasitic in the eggs of some of the insects occurring with them. With these also occurs a species of *Opisthacantha*, doubtless an imported species, now widely distributed. It is probably parasitic in eggs of grass-frequenting Hemiptera, as it has been noticed in numbers in places too dry for the occurrence of Orthoptera, but where *Reduviolus*, *Orthoea* and *Nesomartis* are found. Two species of *Caloteleia* are also recent importations, one first appeared in 1903, the other still later, in Honolulu. The genus *Anteris*, on the other hand, though itself apodemic, contains only endemic species, true forest insects, the hosts of which are not known. There are six described species, all excessively closely allied, and perhaps not all truly distinct. It is possible that they parasitize the eggs of the Locustids of the genus *Brachymetopa*, some of the species of which are unaccountably rare.

PLATYGASTERIDAE.—A single species of *Inostemma*, no doubt introduced recently, is the sole representative known of the above family. It has occurred only in the vicinity of Honolulu.

PROCTOTRYPIDAE.—A single species of *Proctotrypes* is common on the higher mountains of Maui and Molokai[1]. We have bred it from malodorous decaying fern-stems, infested by the larvae of *Drosophila*, and other Diptera. It also frequents *Astelia veratroides*, at the base of the leaves of which decaying vegetable matter accumulates, and forms a breeding ground for small flies.

DIAPRIIDAE.—The species of *Phaenopria* are endemic forest insects, and the endemic genera, *Zacranium* and *Platymischoides*, seem to be derivatives of these. In fact, I have described species of Ashmead's last-named genus, as simply flightless forms of *Phaenopria*, considering the two hardly generically distinct. The species are no doubt numerous in the islands, closely allied, and difficult to distinguish, and some of them show considerable individual differences in the shape of the head. All (except *Zacranium*, the habits of which are unknown) are parasitic on 'vinegar-flies' of the genus *Drosophila*, from which several have been bred. Owing to sexual differences, and the fact that closely allied species live in company, I have not been able to associate the males with their proper females, and until this can be done the former are better left undescribed.

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[1] It is also found on the other islands.

Two species of *Diapria* are of comparatively recent introduction, found in gardens in Honolulu, and becoming more widely distributed. One of these is a common parasite of an imported species of *Drosophila*.

FIGITIDAE.—The parasitic Cynipoids are represented only by members of the subfamily Eucoilinae, and, adopting the views of Kieffer as to their definition, by only two genera. Ashmead, however, recognized six genera in the nine endemic species, that he described. I have increased these to twenty-three, without describing males. The latter cannot without special observations be referred to the other sex. All these Hawaiian forms appear to be related to one another, in the genera, in which they are placed, viz. in *Cothonaspis* and *Eucoila*. Even the distinctions between these genera seem to be broken down to some extent by some of the Hawaiian species. Some species in both genera have been bred, and they are parasitic on the larvae of small flies of the genus *Drosophila*. Some, like *Proctotrypes*, are found at the base of leaves of *Astelia*, where decaying vegetable matter collects and small flies breed. Some frequent bushes or small trees such as *Myoporum*, flying round the foliage, and it is possible that they will be found to parasitize small Diptera, the larvae of which feed in fruits and berries of various native trees. In general, these parasites prefer damp shady places in the forest, where is a dense undergrowth of fern. When largely collected, I anticipate that great difficulty will be found in distinguishing the island species, which may be very numerous. In addition to the endemic species, a single *Eucoilidea* is found on the lowlands in Honolulu, and elsewhere. It is parasitic on small leaf-mining flies of the genus *Agromyza* and certainly introduced.

MYMARIDAE.—Apart from introduced species of *Alaptus*, *Anagrus* and *Leimacis*, of no interest in our fauna, the genus *Polynema* alone represents the Mymaridae. There are, doubtless, many species, fifteen having been already recognized. So far as is known these Hawaiian *Polynema* parasitize the eggs of Hemiptera only, both the Heteroptera (*Reduviolus*) and the Homoptera (*Nesophrosyne*, several species, in the Tetigoniidae, and *Nesodryas* and *Nesosydne* in the Asiracidae). It is probable, however, that they have other hosts, since we have bred a large species from branches of trees, killed by the borings of one of the endemic Tortricid caterpillars of the genus *Archips*. Eggs of the Hemiptera above specified would not be very likely to occur in such a situation.

CHALCIDIDAE.—Four species only of this family occur and one of these, *Chalcis obscurata*, has been imported for economic reasons. It is now one of the most abundant insects in our islands, and serves to conceal the presence of *C. polynesialis*, which still occurs, but is rarely noticed amongst the swarms of its economically important congener. *C. polynesiale*, though occurring in Blackburn's period of collecting, is almost sure to prove an introduction, and recently a third species (though of another genus, *Hockeria*) has become perfectly naturalized on Oahu. *Chalcis obscurata* is interesting, otherwise than economically, owing to the fact that it frequently attacks insects already parasitized by some other insect. Consequently it has even been bred from the pupa of other parasitic Hymenoptera (e.g. the Ichneumonid *Echthromorpha maculipennis*) and Tachinid flies. It seems deficient in its instincts, for we have observed one ovipositing in the pupa (concealed of course between the layers of palm leaf) of *Omiodes blackburni*, when examination showed that the pupa had previously been squashed flat, and was quite dead and dry. Nevertheless in productiveness it is one of the most successful of insects. *Epitranus lacteipennis*, discovered by Mr Blackburn, still occurs on Oahu, but is rarely met with. Its habits are not known, nor has it been found except in the neighbourhood of Honolulu.

EURYTOMIDAE.—Represented only by species of *Eurytoma* and one or two of *Isosoma*, all of recent introduction. The former is hyperparasitic, attacking Braconids, especially *Bracon omiodivorus*, a common parasite of Pyralid caterpillars, and less frequently *Apanteles*. Its presence was not noted until 1903, when it was already numerous. It is very widely distributed, and in Honolulu we have found it on the dry coast of Waikiki, as a hyperparasite of *Omiodes blackburni*, as also in the wet valley of Nuuanu. It is common in some of the cane-fields of Hawaii, where *Omiodes accepta* is an abundant host of *Bracon*, and on one occasion at Pahala we observed countless numbers of the males flying round and running on the leaves of cucurbitaceous plants, growing in waste places. The 'joint-worms' or larvae of species of *Isosoma* are attached entirely to imported grasses, and are abundant in Honolulu and no doubt elsewhere. There appear to be two species, which are parasitized by an Eupelmine Encyrtid, and I think also by a Pteromalid.

MISCOGASTERIDAE.—This family is chiefly represented by a number of species of *Toxeuma* all endemic, and by the endemic genera *Neolelaps* and *Mesolelaps*, the former with several species, though only two have been described. These are all true forest insects and usually sparingly met with. Though we have bred one or two species, their habits are not certainly known. They appear to be associated with the caterpillars of microlepidoptera or small beetles that attack stems or fruits of native trees. The species of *Toxeuma* are likely to prove very difficult to distinguish. They are bred from twigs containing small beetle larvae, *Proterhinus*, *Cis*, etc.

ENCYRTIDAE.—The sub-family Eupelminae is chiefly represented by about fifty described species of the ubiquitous genus *Eupelmus*, forming a remarkable series, diverse in structure and in habits. The specific value of a good many of those that I have described is uncertain, since some of them are variable and the species are no doubt very difficult to determine. It is impossible to correlate the sexes, unless a species has been bred. Most of the known species are found in the mountain forests, but some have occurred on the lowlands and it is possible that some of these are not endemic. Some are egg-parasites of various orders of insects, e.g. *E. axestops* (?) bred from eggs of the Locustid *Brachymetopa*, and *E. rhyncogoni* from those of the Otiorhynchine weevil, *Rhyncogonus*. Others attack larvae of various Coleoptera, or of Neuroptera of the Hemerobiid family (*Anomalochrysa*). Some are frequent parasites of several of the larger bees included in the genus *Nesoprosopis*, and also of certain *Odynerus*, while some are parasitic on Diptera and others of Lepidopterous larvae, both case-bearing and others. The genus *Solindenia*, described as peculiar to the islands, is a common insect, and will almost certainly be found elsewhere. It is parasitic in the egg capsules of cockroaches of the genus *Phyllodromia* and is found to attack foreign species, as well as the native *P. obtusata*. The single *Anastatus* is quite certainly an introduction, and though now widely spread, is a common garden insect in Honolulu, where it parasitizes the eggs of the introduced Locustid *Elimaea appendiculata*. The habits of the one described *Eupelminus* are not known.

Of the Encyrtinae, *Encyrtus fuscus*, one of the most abundant insects in parts of Australia, as we have found it, is no less common in the islands, being introduced and parasitic on various species of scale-insects of the genus *Lecanium*, also introduced.

The members of the tribe Mirini include some common parasites of foreign scale-insects, *Microterys flavus* e.g., and *Blepyrus insularis* (= *B. marsdeni* How.) which are clearly introduced. Others, however, are likely to prove endemic, e.g. the parasites of the Dryinid leaf-hopper parasite, *Pseudogonatopus*, and a species, which infests the larvae of various kinds of wasps of the genus *Odynerus*. *Aphidencyrtus* on Aphidae is of course introduced, as also is a species, for which the late Dr Ashmead proposed to characterize a new genus, *Amicroterys*, common in gardens in Honolulu, where it parasitizes an abundant scale-insect of *Cynodon dactylon*.

The habits of several other species are at present unknown.

The tribe Ectromini includes six species of the genus *Anagyrus* (?) described by myself, but whether these are all really good species is doubtful. Their habits are not known, and until these are ascertained, I feel doubts as to the endemicity of the species. They occur near the coast, as well as in the mountains. Should they prove to be parasites of foreign Coccidae, we may be sure that they are themselves foreign and either have been introduced accidentally with their hosts, or in some cases, possibly, for economic reasons by Koebele. He, as I know positively, attempted to introduce *Anagyrus* from China and Japan.

PTEROMALIDAE.—The great complex of genera here included, is almost unrepresented by endemic species, for of the very few known to exist in the islands, only one, *Spalangia lanaiensis* has any claim to be considered indigenous. This is a true forest insect and has been bred from more than one of the smaller endemic species of *Drosophila*. Two other species of *Spalangia* are known, but they are clearly importations, parasitizing the puparia of various common introduced flies, the larvae of which feed in cow dung or other excrement. One of these was identified as *S. hirta*, and in fact it is practically identical with specimens of a *Spalangia* from Europe and China, and hardly different from a Mexican form. Still it does not agree with Haliday's description in the length of its antennal joints, and so we have considered it to be distinct from *S. hirta*.

One or two species of *Pteromalus*, one of which has been bred from a foreign Tortricid, are not likely to prove endemic, and one or two of the genus *Pachyneuron* or allied forms connected with foreign Diptera, are likewise introductions.

The scale-insect parasite *Tomocera californica* is an introduction from Australia, where we have seen it, and other species of the genus, in abundance. It was found commonly by Mr Blackburn, and described as a new genus *Moranila*. Although it bears the specific name *californica* it is of course an introduced species in California, as into the islands. Owing to other parasites and predators, introduced to destroy *Lecanium*, the *Tomocera* is now far less plentiful than it was some fifteen years ago.

EULOPHIDAE.—In this family the sub-families Aphelininae and Tetrastichinae, the former with numerous species parasitic on introduced Aphidae, Coccidae and Aleyrodidae, are all probably introduced, the only species that are at all likely to prove endemic are in the Tetrastichinae, viz. the polyphagous *Melittobia* and an undescribed forest-frequenting species of uncertain genus and habits. I believe, however, that these are also introductions, like *Tetrastichus hagenowii*, which is hyperparasitic in cockroach egg-cases, wherein it attacks *Evania*. *Paraphelinus xiphidii* is an Aphelinine of rather ordinary structure, but most interesting from its habits. It parasitizes the eggs of the common imported Locustid, *Xiphidium varipenne*, and also is a hyperparasite of leaf-hoppers, breeding in the cocoons of the Dryinid *Haplogonatopus*, as recorded by Swezey. This diversity of habits in a member of a group so constant otherwise in the limits of its parasitism, is of great interest.

The other members of the Eulophidae must, in the present state of our knowledge, be considered specifically endemic, though none of the genera are peculiar to the islands. They include in the Entedoninae the genera *Astichus* and *Omphale*; in the Elachistinae *Ophelinus*; and in the Eulophinae *Hemiptarsenus*, *Necremnus*, *Sympiesis* and *Eulophus*. In some of these genera several new species (at present undescribed) are known, but they preserve very badly and offer small attraction to the collector or describer. Many of them are familiar parasites of leaf-mining microlepidoptera and they are commonly bred from mines of *Philodoria* in leaves of *Pipturus*, *Metrosiderus*, etc. and from the common circular mines that so often disfigure the foliage of *Pelea*.

The species of *Omphale* is (if indeed there be only one) remarkable for its extreme variability in size, colour and sculpture. It attacks various leaf-mining caterpillars, those of *Gracilaria* being commonly parasitized on the lowlands, and those of *Philodoria* in the mountains. It is, however, known to attack species other than leaf-miners, e.g. various microlepidoptera, whose larvae live in fruits, etc.

TRICHOGRAMMIDAE.—It is doubtful whether there are any species of this family endemic, and highly improbable that any of those hitherto discovered are other than introduced. *Westwoodella hilaris* is found on foreign grasses in gardens in Honolulu and itself is clearly foreign. Of *Pentarthron* (which appears to be a synonym of *Trichogramma*) several species occur. *P. flavum* is a parasite of lepidopterous eggs and is often seen running on foliage, as also is *P. semifumatum*. *P. flavum* may be no more than the widely distributed *Trichogramma pretiosa*, which attacks many kinds of insect eggs. The eggs of *Anomalochrysa* are parasitized by the same genus, possibly by the same *T. pretiosa* (or *P. flavum*) or by a variety of this. Eggs of the introduced Locustid, *Elimaea appendiculata*, are attacked by another species, apparently undescribed, many individuals of the parasites emerging from a single egg of the cricket.

EVANIIDAE.—One of the two species of *Evania*, both of which are very common insects on the lowlands and lower mountain slopes, is of wide distribution outside the islands, being carried in ships; the other is only known at present from the islands, but is certainly foreign, and will be found elsewhere. It is, like the common *E. appendigaster*, a parasite of foreign cockroaches, not of the one endemic *Phyllodromia*. Both these *Evania* are attacked by the hyperparasitic *Tetrastichus hagenowii*.

ICHNEUMONIDAE.—Ichneumoninae are entirely wanting, except for a species of *Ichneumon*, introduced for economic reasons by Koebele, and the Cryptinae have three species of *Hemiteles*, as recognized by Ashmead, but all the Hawaiian specimens of the genus that I have seen belong to one variable species, presumably *Hemiteles tenellus*, a common parasite of *Chrysopa*, introduced from N. America. The Pimplinae are more interesting, for we find here an endemic genus, *Glyptogastra*, with two described species. The habits are not certainly known, but we have found one species flying about twigs bored by caterpillars of a large species of *Archips*, the pupae of which it may parasitize. *Echthromorpha maculipennis* is remarkable for its great variability in details of colouration, size and otherwise. It is doubtful whether all the Hawaiian specimens are not referable to one, though extreme variations might be described as forming several distinct species. This parasite is almost ubiquitous, being found in gardens in Honolulu and throughout the mountains, and in cultivated places on all the islands. It is often extremely numerous in individuals and parasitizes many very different kinds of Lepidoptera. Chrysalides of *Pyrameis tammeamea*, found in the forests, more often produce this parasite than the butterfly, in my experience. All pupae that are moderately exposed, such as those spun up in cocoons on leaves of trees, or between layers of leaf are sorely attacked by this parasite. *Plusia*, *Omiodes* and other Pyralidina, as well as the *Pyrameis*, are favourite hosts. It abounds in localities with excessive rainfall. *Pimpla hawaiiensis* is an apodemic species, which we have bred from a Mexican Tortricid. In the islands it is often bred from pupae of introduced Tortricina, as well as from native Pyralidina. It is very abundant.

The Tryphoninae are represented only by two widely distributed European species, both of course introduced, viz. *Metacoelus femoralis*, which seems barely to maintain its foothold, and *Bassus laetatorius*, the too abundant parasite of the introduced Australian Syrphid fly, *Xanthogramma grandicornis*.

The sub-family Ophioninae is by far the most important section of the Hawaiian Ichneumons. At the present time I recognize forty species of this group distributed in eleven genera, *Idecthis* and *Lathrostizus* being considered synonymous. One species of *Limnerium* is certainly foreign, being a common insect in cabbage gardens, where it parasitizes *Plutella cruciferarum*. The single *Idecthis* and *Lathrostizus* are also subject to great suspicion, as introductions, and also the *Pristomerus*, though at present they have not been identified from other countries. The bulk of the species, as will be seen, if we subtract these dubious natives, belong to the true Ophionines and the genus *Atrometus* of the Anomalines. Of the former the genera *Banchogastra*, *Pycnophion* and *Pleuroneurophion* are endemic, the two former indeed are amongst the most remarkable of their group. Most of the species of the Ophionines are absorbed in the genus *Enicospilus*. These are remarkable for the variability of important characters, as well as superficial ones, so that sometimes individuals are met with, which have lost the generic distinctions. In consequence, the status of the species is by no means settled, and the more the specimens are collected the more difficult is it to define the specific characters. One striking character, in which variation is shown in some species, is the transverse propodeal carina, while in others it appears to be quite constant. In some variable species it may be present and distinct or largely effaced, according to the individual. In some species the carina is normally well-developed in the female and wanting in the male, as in the case of *Enicospilus kaalae*, but in this species a proportion of the males have the carina strongly developed like that of the female. The spots in the discocubital cell also are subject to variation and may be distinct or effaced in different individuals of a single species. In some species they appear to be normally or always absent, decharacterizing the genus.

Many of the Hawaiian Ophionines may be seen flying freely in the forests in the day time, especially in places where ferns grow freely. They are also on the wing at night and are sometimes attracted to lights. Many are of social habits and crowd together in numbers, when at rest. We have seen dozens of examples of a species resting beneath one or two adjoining leaves of a large-leafed tree, so thickly indeed as to hide the surface. At other times they form great flocks in dead hanging fern fronds. These assemblies are sometimes all of the male sex, but sometimes mixed. Sometimes too the species are mixed in these assemblies. So far as we know only *Enicospilus* and *Pleuroneurophion* congregate in this way, the others being more solitary. Individuals of many of the species are very numerous. Even within a mile from Honolulu, on the fore hills, we have seen hundreds of examples of *Enicospilus molokaiensis* (? *Ophion lineatus* Cam.) flying about together in the sunshine, in an area of a few square yards. Geometers, Pyralids and Noctuids have all been found parasitized by *Enicospilus*, but though many members of the large genus *Scotorythra* (Geometridae) have been bred, they have very rarely been found to be attacked. Consequently I suspect that the caterpillars of the genus *Agrotis*, when occurring in localities, where the parasites are common, will be found more subject to their attack. The smaller *Athyreodon* attacks Pyraustid caterpillars of the genus *Phlyctaenia*.

Limnerium blackburni is one of the commonest Hawaiian insects, of universal distribution in the islands, and exhibiting slight variation in superficial characters. It attacks so many of the Pyralidina that it is useless to specify particular species parasitized, but *Omiodes* and *Phlyctaenia* are favourite hosts. We have known *Phlyctaenia stellata*, for instance, to suffer from its parasitism to such an extent that about 90 per cent of the caterpillars were destroyed. It also attacks *Scoparia* as well as Tortricina and Tineina, and parasitizes foreign as well as endemic caterpillars, being notably polyphagous. *Pristomerus*, I think, has but one variable species, not two, as described by me. My original specimens coming from different islands and differing greatly in superficial appearance were not recognized as belonging to one species. It parasitizes the caterpillars of various Pyralidina, while *Lathrostizus* is often parasitic on some domestic caterpillars, probably Phycitidae. The small Anomalines of the genus *Atrometus* are met with much more sparingly than the Ophionines. They are found only in the forests, flying over ferns, or round bushes, especially *Myrsine*, *Pelea*, etc. They have been bred from the larvae of endemic Tineina or Tortricina feeding in shoots of native trees.

ALYSIIDAE.—*Aphaereta muscae* is an introduction from N. America, and a common parasite of various foreign flies, the larvae of which live in cow dung. *Aspilota* has been bred from similar Dipterous insects and is also probably foreign. There are no certainly endemic Alysiids known.

BRACONIDAE.—The Aphidiinae are represented by a single introduced species, which destroys the cabbage Aphis, the Euphorinae by '*Centistes*' *americana*, a common parasite of the imported ladybirds *Neda abdominalis* and *Coelophora inaequalis*. The

Cheloninae have three species; *Chelonus blackburni*, occurring also in Australia, is a very common parasite of various foreign Lepidoptera of different families, sometimes attacking native species also. *Phanerotoma hawaiiensis*, which first appeared between 1897 and 1900, and is now common, was probably introduced by Koebele from Japan, while quite recently another species has appeared in Honolulu. The Agathidiinae are represented only by *Microdus hawaiicola*, not a true forest insect, but which, being polyphagous, has been bred from caterpillars of foreign Tineina of various kinds, the imported cotton-boll Gelechiid (*Gelechia gossypiella*) being one of these. It does, however, attack endemic Tineina, e.g. *Hyposmocoma*. The Microgasterinae contain several species of the ubiquitous genus *Apanteles* (s.l.), two at least of which are known to be parasites of apodemic Tineina and Tortricina. No doubt all are introductions. The Braconinae, quite unrepresented in Blackburn's collection, now have several species of *Bracon*, one (*B. omiodivorum*) being a most abundant parasite of the Pyraustid caterpillars of the genus *Omiodes*. It was introduced, I believe, by Koebele and has spread and increased greatly during recent years, having now entered the mountain forests. Another species is an abundant parasite of a Trypetid fly of the genus *Tephritis*. A species of *Habrobracon* is often found in houses, being parasitic on caterpillars that attack articles of food. It is also common enough in the open, where it frequently parasitizes Phycitidae that infest the pods of the algaroba tree, *Prosopis*. *Ischiogonus palliatus* of the Rhogadinae was discovered by Blackburn, and is probably now more abundant than formerly, attacking larvae of Longicorn beetles, whether native or foreign. It is also found in Fiji, and was no doubt introduced into the islands. It exhibits a good deal of variation, this apparently depending to some extent on the species of its host. It appears to attack some Curculionidae as well as Cerambycidae. A second species has more recently been introduced and freely parasitizes *Clytarlus* and *Plagithmysus*, the endemic Longicorns, as well as some imported genera. The insect described as *Hormius* (?) *peregrinus*[1] is parasitic on xylophagous beetles of the family Bostrychidae, and is of recent introduction, being sometimes found commonly in Honolulu. This insect is no true *Hormius* and seems to be related to the Helconinae, and perhaps should be transferred to that group. It also occurs in Fiji. In the Spathiinae, *Ecphylopsis nigra*, a minute flightless insect, is no doubt endemic, and is the only known Braconid that has any claim to be considered so. It is known to me from all the islands (except Lanai) and is a true forest insect. It is bred from dead wood containing larvae of minute beetles, e.g. *Proterhinus*. A minute species of *Spathius* has once occurred in Honolulu and is certainly introduced. It was found flying about some boards, that were infested by countless individuals of a probably foreign *Dryophthorus*. One or two other species of Braconidae of recent introduction are not included in this account, as they have not yet been examined.

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[1] This is probably *Euscelinus* of Westwood.

Review of the Coleoptera.

Forty-three (or if the Lyctidae be considered as a group in the Bostrychidae 42) of the 85 families of Coleoptera, as enumerated by Sharp in the *Cambridge Natural History*, have representatives in the Hawaiian islands.

Of these families, however, 26 are, as I believe on various kinds of evidence, entirely foreign to the natural fauna, being introductions by man, and four others (Hydrophilidae, Dytiscidae, Anthicidae and Coccinellidae) are represented by either imported or naturally immigrant species, likely to be found elsewhere. Excluding these, the real Hawaiian fauna of beetles represents only 17 families.

The total number of species described or enumerated[1] is 1288, these being included in 229 genera.

The 26 families above mentioned as being foreign to the natural fauna are represented by only 71 species and these are scattered in no less than 57 genera. However, as many of the families belonging to the true native fauna are represented not only by species and genera that are really native, but also by introduced ones, it is necessary to analyse these 17 families in order to understand the true nature of the fauna. Thus in the Cerambycidae 10 of the species, each belonging to a different genus, are importations by man, leaving five genera with 52 species native.

The Curculionidae have 14 foreign species (one or two, however, being natural immigrants) in nine genera; 132 species in 12 genera are of the true fauna. The genus *Pentarthrum* contains imported and a native species.

The Scolytidae have seven foreign species in three genera; 17 apparently native species of *Xyleborus*, which also contains foreign forms.

There are 136 endemic species of Proterhinidae, at present all included in the genus *Proterhinus*.

The Cistelidae are represented only by endemic forms, the two genera containing 12 species.

The Tenebrionidae have eight foreign species in six genera; one genus with a single species is possibly endemic, but will quite probably be found elsewhere.

The Cioidae have three probably foreign species in one genus, leaving 39 truly endemic forms in two genera.

The Anobiidae have four foreign species in three genera, and 134 endemic in the same number.

The Elateridae have five foreign species in five genera; the native fauna has also five genera with 76 species.

The Lucanidae have one genus endemic, with seven species.

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[1] This does not include a number of species introduced for economic reasons, nor a number of recent casual introductions, now well established.

The Dermestidae have three foreign genera with five species; three genera with 21 species are endemic.

The Cucujidae have 10 foreign species in seven genera; there are 10 native species in two genera.

The Colydiidae are represented by three foreign species, each in a different genus, and a single endemic genus with one species.

The Nitidulidae have six foreign species in two genera, and 136 native ones in 13 genera.

The Histeridae have five foreign species in three genera, and 34 native in a single genus.

The Staphylinidae have 24 foreign forms included in 16 genera, and 95 true members of the fauna in 13 genera.

The Carabidae have six probably foreign forms in three genera, and 204 endemic species in 36 genera.

If we remove from the above families the introduced species and the few natural immigrants, either known to be found or likely to occur elsewhere, and add these to the 71 species found in families that contain only foreign forms, we find that the foreign element consists of 181 species distributed in 131 genera. The truly native fauna on the other hand consists of 1107 species distributed in 102 genera. Thus in the foreign element these genera contain rather less than 1·4 species to each genus on the average, while in the other group the species are 10·8 to the genus. Perhaps, however, the few certain natural immigrants should be rather added to the truly native species, but as these immigrants number in all less than a dozen, the striking contrast between the natural and imported coleopterous fauna would be only slightly changed thereby.

We must also notice an essential difference between the native genera and the imported ones. Thus the latter are rarely or never closely related one to another, while many of the former are formed for species which are clearly closely related to other endemic species, so that the genera are frequently very closely allied to one another, and in fact difficult to distinguish by trenchant characters. For instance, many of the genera of Carabidae are excessively closely allied and the distinguishing characters are not always constant. The three allied genera of Cerambycidae, *Plagithmysus*, *Callithmysus* and *Clytarlus*, contain species that show characters connecting one with another.

In some of the genera the species are remarkably restricted in their range over the islands. This is notably the case with the Cerambycidae above mentioned, for not one species is known to inhabit even two of the islands. The fact is the more remarkable as these beetles possess strong organs of flight and in fact fly strongly with the wind. Moreover they could also be carried in the larval and pupal state from one island to another in floating trees or their limbs. The Carabidae and

Proterhinidae, the former usually and the latter always flightless, are also mostly of different species on the different islands, but the species of *Cis* on the other hand are generally widely distributed throughout the group.

Many of the species of Cerambycidae, Curculionidae, Carabidae, Cioidae, and Anobiidae exhibit much variability in structure in individuals. Owing to their generally distinctive appearance this leads to no particular difficulty in the separation of the species of Cerambycidae, but in nearly all the other families many of the larger genera are extremely difficult to deal with. Probably no more difficult study in systematic entomology could be found than the working out of the Hawaiian Nitidulidae, Anobiidae, and some other groups.

The following 80 genera are, so far as is known, endemic: *Plagithmysus*, *Callithmysus* and *Clytarlus* (Cerambycidae); *Chaenosternum* (?), *Orothreptes* (?), *Deinocossonus*, *Nesotocus*, *Dysomma*, *Heteramphus*, *Oodemas*, *Anotheorus* (Curculionidae); *Labetis* (Cistelidae); *Apterocis* (Cioidae); *Holcobius*, *Xyletobius* (Anobiidae); *Eopenthes*, *Itodacnus*, *Dacnitus*, *Ceratotaxia* (Elateridae); *Apterocyclus* (Lucanidae); *Labrocerus*, *Argocerus*, *Eocerus* (Dermestidae); *Brontolaemus* (Cucujidae); *Antilissus* (Colydiidae); *Goniothorax*, *Gonioryctus*, *Nesapterus*, *Eunitidula*, *Orthostolus*, *Cyrtostolus*, *Apetasinus*, *Apetinus*, *Eupetinus*, *Nesopeplus*, *Nesopetinus*, *Notopeplus*, *Cillaeopeplus* (Nitidulidae); *Lispinodes*, *Nesomedon*, *Leurocorynus*, *Xanthocorynus*, *Holocorynus*, *Liophaena*, *Eudiestota*, *Eusipalia* (Staphylinidae); *Blackburnia*, *Deropristus*, *Atrachycnemis*, *Anchotefflus*, *Pseudobroscus*, *Derobroscus*, *Brosconymus*, *Anchonymus*, *Mauna*, *Disenochus*, *Chalcomenus*, *Barypristus*, *Baryneus*, *Colpodiscus*, *Prodisenochus*, *Apteromesus*, *Mysticomenus*, *Colpocaccus*, *Atelothrus*, *Mesothriscus*, *Mecostomus*, *Mecomenus*, *Metromenus*, *Mecyclothorax*, *Thriscothorax*, *Atelothorax*, *Metrothorax*, *Gnatholymnaeum*, *Nesolymnaeum*, *Nesocidium*, *Atelidium*, *Metrocidium*, *Nesomicrops*, *Macranillus* (Carabidae).

Proterhinus, representing the fam. Proterhinidae with its very numerous species, is only known at present by a single Samoan species other than the Hawaiian series.

One or two genera, though described from the islands and not at present known elsewhere, are, doubtless, introduced. These are not included in the above list. It may be noted that the greater number of new genera are found in the Carabidae, Nitidulidae, Staphylinidae, Elateridae and Dermestidae, groups classified by Dr D. Sharp. It is therefore quite possible that had the abundant species of the families Curculionidae, Cioidae, Proterhinidae, and Anobiidae, groups worked out by myself, been described and arranged by him, his profound and special knowledge of the Coleoptera would have led to the formation of many genera in these families likewise.

CHRYSOMELIDAE.—This family is represented by the introduced pest of the tobacco and various Solenaceous plants, *Epitrix parvula*. Probably it has not existed in the islands for more than 30 years, since it was not collected by Mr Blackburn. It is very abundant in some localities on the 'Poha' or 'Cape gooseberry,' *Physalis peruviana*, riddling the leaves, as it does those of the tobacco. One or two other Chrysomelidae have lately been introduced, but are not included in this work.

BRUCHIDAE.—*Bruchus prosopis* is now an excessively common beetle, and very injurious to the seeds of that most important tree the 'algaroba' (*Prosopis*). Four or five other species of *Bruchus* are likewise more or less common, the *B. chinensis* being frequently seen in vast numbers in stores, being more domestic than the others. The larger *Caryoborus gonagra* is also highly injurious to the seeds of various Leguminous trees.

CERAMBYCIDAE.—The single species of each of the genera *Parandra* and *Aegosoma* are apparently endemic. The former often breeds in great numbers in large, standing, but dead or partly dead, Koa trees, though by no means confined to these trees. Very minute examples, not one quarter the bulk of ordinary individuals, were found in small decaying logs of *Myrsine* and *Straussia* on Molokai, and very large ones in very wet logs of entirely decayed wood on Kauai. When mature the beetles may be sometimes found beneath close-fitting bark, their flattened form allowing of this mode of concealment. When disturbed, they will feign death. Sometimes they are attracted to lights at night. The larvae vary greatly in size according to the condition and nature of their food. They have small but quite well-developed thoracic legs. The ovipositor of the female is a very strong and hard organ, so that on casual inspection it might be mistaken for an aedeagus, and this sex wrongly supposed to be the male. The *Aegosoma* has much the habits of the *Parandra*, and is often found in company with it. Larvae are frequently found in the wettest and most rotten logs or even in the soil beneath these. They also attack healthy living trees of *Myoporum*, and in fact are polyphagous, though usually confined to dead wood. In tracts cleared of forest and planted with sugar-cane or coffee, they have been known to attack these beneath the soil. *Aegosoma* is very readily attracted to light.

Xystrocera globosa has been introduced within the past 20 years and is now very common in Honolulu. It breeds especially in the wood of some of the foreign Leguminous trees, that are such an ornament in the city. The beetle may often be seen resting on the trunks of affected trees in the daytime, or flying round electric lights at night.

Astrimus hirtus is a common species in and around Honolulu, but has not been noticed elsewhere. It particularly affects the old 'Hau' trees on the coast and may be found resting in the crevices of the bark by day, or seen running rapidly and in numbers over the surface after dark. It follows the Hau trees to an elevation of some 1200 feet up the mountain slopes, but is much less common there than near the beach. Widely distributed outside the islands to the west, it was probably an early introduction from Fiji or Tahiti.

Ceresium simplex is much more abundant and widely distributed than the preceding. Though most common amongst the algaroba trees of the lowlands, it has been occasionally bred from native forest trees at an elevation of 1500 ft. It sometimes swarms around the electric light at night. *Curtomerus pilicornis* is an introduction from the New World, now very common round Honolulu and occasionally found as high as 1500 ft. in the mountains. The larva is found in dead stems of various trees. We have observed it very commonly in the planted forest of Eucalyptus, immediately behind the city. It is also found in dried stems of some low-growing plants. The larva is parasitized by *Ischiogonus palliatus* and *I. pallidiceps*. *Clytus crinicornis* is excessively common throughout the islands on felled trees of *Prosopis*, and some of the larger Leguminous species, and does damage to the wood, if it is left lying exposed to its attack. It is not known to be attacked by parasites, and is confined to the lowlands and lower mountain slopes. The beetle is also frequently seen on various flowers.

There are 14 species of the endemic genus *Clytarlus*, which is closely related to the larger-sized *Plagithmysus*. Excepting *C. abnormis*, which perhaps is not a true member of the genus, all the species are attached either to *Sophora chrysophylla* or *Acacia koa*. No species are known from Molokai or Lanai, the almost total destruction of the native acacias on these islands being no doubt responsible for their absence. Most of the species are attached to the twigs and small branches of the trees, whereas the larger *Plagithmysi* feed usually beneath the bark of the trunks and larger limbs. The larvae of *Clytarlus* are now much destroyed in some localities by the comparatively recent introduction of the Braconid, *Ischiogonus pallidiceps*, and *I. palliatus* also attacks them. In one case we noticed about 90 per cent. of the larvae of *C. fragilis* to be destroyed by these parasites. On Maui, the remarkable bird, *Pseudonestor*, is continually hunting for the larvae and those of *Plagithmysus*, and its stomach is often entirely filled with this food.

Plagithmysus is a genus of larger and more conspicuous beetles than *Clytarlus*. There are 33 described species, and one or two still undescribed are known to me, as well as the larvae of several others distinct from these. They are of very remarkable appearance and often mistaken by non-entomologists for crickets or grasshoppers. Their wings are partly exposed, continuing the outline of the elytra, their folding being abnormal. The hind-body is extremely small, either in both sexes or at least in the males. Many of the species are able to produce a sound by the rubbing of the basal part of the hind legs, which are tuberculous, along the sculptured margin of the elytra; and some have stridulating organs on the middle and hind coxae, the middle ones operating on the adjoining edge of the thorax, the hind ones on a ridge on the basal segment of the abdomen. All have the usual stridulating apparatus on the scutellum. The more slender-legged species run with extraordinary rapidity on the trunks and branches of the forest trees, and they often perform curious evolutions, running in short curves or zigzags, and at times almost leaping. Sometimes the hind femora are notably spread outwards and kept well away from the elytra, as if to avoid their rubbing together. Individuals of many of the species exhibit great variability. Variation in size is very striking in many species, and there is very noticeable variation in structure of some, apart from size, e.g. in the form and development of the pronotal crest. The most conspicuous variability occurs in the colour of the legs of some of the species, which in this respect are dimorphic or trimorphic. (Plate XV, figs. 5—11.)

Thus in *P. aequalis* the hind femora are either red or black, and of 181 examined 70 had red legs.

In *P. blackburni* of 68, five only had red legs.

In *P. lamarckianus* black and red-legged forms are both common, the red femora of the latter usually being black or dark apically.

Of 98 *P. varians* 41 had black legs, 53 had black or dark legs with the apical part conspicuously red, while four were of a nearly uniform reddish colour.

P. varians, *P. lamarckianus*, *P. blackburni* and *P. darwinianus* are excessively closely allied species, and but for the fact that they have been carefully studied in the field, many might doubt their claim to be distinct. *P. darwinianus* is very constant in its uniformly red femora, which are merely of a darker shade in some than in others.

It is interesting to note the very different nature of the variation in these species. Thus *darwinianus* is constantly red-legged, *blackburni* is black-legged, rarely with red legs; *lamarckianus* has commonly either red or black femora, *varians* has a very common form quite unlike any of the others, a very scarce red-legged form like *darwinianus* or some *lamarckianus*, and a common black-legged form like *blackburni* and some *lamarckianus*. Other species, like *P. giffardi* and *P. bishopi*, with red femora black or dark apically are extremely constant and no noticeable variety has been found.

As with *Clytarlus*, the two native acacias, *Acacia koa* and *Sophora chrysophylla*, are favourite foods of *Plagithmysus*, for six species are found on the former and three on the latter tree.

The remaining 25 species are attached to a very varied list of food-plants (with the rarest exception each being confined to one). Thus Urticaceae, Myrtaceae, Myrsinaceae, Rubiaceae, Rosaceae, Rutaceae, etc., are attacked. In this connection it is interesting to refer to the closely allied species of the *P. darwinianus* group above mentioned. All these are common species and have been much observed in the field, and in some spots *P. darwinianus*, *lamarckianus* and *varians* have been found in numbers within a few yards of one another. Yet in spite of this and the fact that the females of *Plagithmysus* readily attract the males, not one example of either of these has ever been found to attack the tree affected by the others, *varians* being restricted to *Acacia koa*, *lamarckianus* to *Pipturus*, and *darwinianus* to *Sophora chrysophylla*. It is pretty certain that, however slight be the characters that separate these species, no interbreeding takes place between them, each remaining constant to its own food-plant. In fact, almost all the known species of the genus remain equally attached to their special food-plant, and as it might be supposed that change from one food to another may have in some of these cases led to the formation of species, we must refer to the case of *P. vitticollis* and its var. *longulus*.

The var. *longulus* is one of the most constant in a general way of the species of the genus and its larva lives beneath the bark of *Bobea*, a Rubiaceous forest tree. *P. vitticollis* (typical) affects a native species of *Rubus* (Rosaceae). Some of the examples (perhaps most) exhibit pallid colouring on the elytra, which is never the case with the var. *longulus*. Where the latter form occurs we have not found individuals attacking *Rubus*, though it grows there. The true *vitticollis*, found on *Rubus*, were a few miles from the locality, where the var. *longulus* occurred, and perhaps no *Bobea* grew there.

The case of *P. bishopi* is also remarkable. This is attached to *Pelea*, a Rutaceous tree. On one occasion near by some *Pelea* trees, affected by *bishopi*, I found a different tree, *Zanthoxylon sp.*, on which were specimens of this *Plagithmysus*. This particular tree had been known to me for years, when it was in sound condition, but had now been injured and attracted the beetles. There were many larvae feeding in the bark and the larger ones were taken and subsequently bred, yielding perfectly typical examples of *P. bishopi*. It may be noted that a curious variety (var. *gracilis*) of *P. bishopi* was previously found in the same locality on an unidentified tree other than *Pelea*, and I have some suspicion that this tree may have been of the same species as the one above mentioned. Although the individuals that were bred proved to exhibit no variation, yet it would have been very interesting to have continued this breeding, as in course of time it is by no means unlikely that variation would have shown itself. It remains to notice the case of *P. sulphurescens* and *giffardi*. The first specimens of *sulphurescens* were taken on the Urticaceous tree, *Urera sandwichensis*, and are described as having the base of the elytra fulvous. Some, captured on the wing I believe, had this part black. *P. giffardi* shows no variation and has the elytra black at the base. It is attached to *Myrsine* (Myrsinaceae), and this may have been the case with examples, taken flying, in my early collections. It is therefore uncertain whether the two are really distinct.

Whereas most of the species of *Plagithmysus* attack only unhealthy trees or such parts as are in unsound condition, some affect those that are apparently quite healthy. Thus *P. perkinsi*, as evidenced by the exit holes of the beetles, sometimes breeds numerously in trees of *Myoporum*, without noticeably injuring the tree, and the larvae of *P. speculifer* live in the stems of *Urera*, which appear quite sound. Many of the species can be obtained in any number by felling the kinds of trees that they affect, in many cases the beetles appearing in numbers two or three days after a tree is cut down and continuing to be found for weeks. *P. perkinsi*, *speculifer*, *vitticollis* and others, when in the larval condition, often feed in the actual wood or in the pith of the trees, but most of the species feed in or just beneath the bark, leaving long flat grooves, where they have fed. Before pupation, however, these usually enter the wood for that purpose. A few of the species are much more sluggish than the very active majority, though even these (e.g. *P. pulverulentus* and *perkinsi*) can run with speed on occasion. In dull weather the beetles are found with difficulty, in fact at such times and at night they appear generally to leave the trees they affect. In the very early morning we have several times seen individuals rise out of the underbrush and fly to the tree trunks, as the sunshine became warmer, they having evidently rested during the night amongst the lower-growing plants.

Like the common introduced *Clytus crinicornis*, the males are very active in pursuit of the females, and both sexes copulate with different individuals. Where there is conspicuous di- or trimorphism the females will pair successively with males of each form. The male often accompanies the female as she oviposits, holding on with the front and walking with the hind legs, and every now and then copulating afresh.

Plagithmysus is attacked by the two Braconid parasites of the genus *Ischiogonus*, one of which first appeared about 15 years ago, while the other (which also inhabits Fiji) is a more ancient introduction. Several parasites may be bred from a single partly grown larva. On one occasion, of over 80 larvae of *P. solitarius* taken on the mountains just behind Honolulu only two small individuals had escaped these parasites.

The species of *Callithmysus* resemble those of *Plagithmysus* in habits, and the two genera are intimately connected. The three species inhabit only Oahu, and one of them, *C. cristatus*, was formerly considered to be a *Plagithmysus*. This species seems closely connected with *P. robustus* (*pulverulentus*), and the Maui species *P. funebris* is also somewhat similar to these. It would appear that all or most of the known Oahuan *Plagithmysus* have a tendency towards the *Callithmysus* form, the thickness of the hind legs being very noticeable as compared with those of allied species from the other islands. *C. cristatus* is attached to *Acacia koa* and is often found in company with *P. pulverulentus*, but *C. koebelei* is found on *Pipturus* and *C. microgaster* on *Bobea*, all of which trees are favourites of *Plagithmysus*.

CURCULIONIDAE.—The 24 described species of *Rhyncogonus* are endemic with the possible exception of one or two, which may be natural immigrants. These *R. vestitus* and *R. extraneus* live outside the forest region and are attached to apodemic plants.

The former has been observed in enormous numbers, frequenting *Vitex trifolia* on the sandy isthmus on Maui, the latter affects verbenaceous weeds on Oahu. The forest-frequenting species are rather diverse in habits, some moving around freely in the daytime, others resting at that time beneath bark, in moss, or amongst the foliage. Many are gregarious or sub-gregarious, so that occasionally a number of examples may be found resting side by side. Although many are more or less rare insects, there is evidence that some of these occur in great numbers at times, or at least have been very numerous, since in some localities we have found the soil full of the detached elytra, when living examples were not to be found. Many of the species are very imperfectly known, and in spite of their considerable size are not easily distinguished, being notably variable both in superficial appearance, and in points of structure. Their headquarters are apparently on Kauai and Oahu at the one extremity of the group; none are known from Hawaii at the other end and but few at present from Maui. There is no doubt that many of the species are very local or restricted in range on the island that they inhabit, so that many more species, or at least varieties of known forms, should be discovered in the future. While some like the dense and wet forests, others inhabit very dry localities, with scattered brush or small trees. Some of the species, such as the well-known *R. blackburni* and *koebelei*, are known to be polyphagous, frequenting various forest trees and even some species of ferns. The life-history of the former is to some extent known and no doubt others will be found to resemble this in a general way. The eggs are laid in numbers between two leaves of *Acacia koa* (and no doubt of *Straussia*, *Bobea*, etc.) which are glued together. The young larvae on emergence drop to the ground and no doubt feed on the decaying vegetable matter contained in the soil. The eggs of *R. blackburni* are parasitized by the Chalcid, *Eupelmus rhyncogoni*, one parasite emerging from each egg. No doubt other and rarer species will be found to have similar parasites, the number of eggs laid being out of all proportion to the number of adult beetles that are found. On Kauai the scarce little thrush, *Phaeornis palmeri*, is a most successful hunter of *Rhyncogonus*, for in all cases these beetles were found in the bird's stomach, even to the exclusion of all other food, while they have been found in no other bird.

Pantomorus fulleri is an injurious beetle, imported, doubtless, with hot-house plants from California. It was not known in Mr Blackburn's time. It first became conspicuous on Maui, but it is now injurious on Hawaii, Oahu and Molokai. Of the forest trees it is very partial to *Acacia koa*, the eggs being laid in masses in cracks of the bark or in swellings caused by a Tortricid caterpillar. The young larvae fall to the ground and feed in the soil, the habits being much like those of *Rhyncogonus*. The beetle itself defoliates the rose, fruit-trees, and other plants, and in default of other food it will attack young sugar cane. Being apterous, it could probably have been easily controlled, if not exterminated, in the first period after its introduction.

Cylas formicarius is another introduction, which still occasionally reaches the islands in consignments of sweet potatoes. The larvae is common not only in these, but also in some of the wild Ipomoeas, especially *I. pes-caprae.*

The 21 species of *Acalles* are all endemic. They are difficult to collect and very imperfectly known at present, and being often variable, with great sexual differences, are still more difficult to separate specifically. Moreover examples in different condition as to freshness have a very different appearance. Some of the species can, however, be easily bred from dead wood, and until long series of many species are obtained in this way their number will remain quite uncertain. With the exception of *A. tuberculatus* found beneath small logs lying on the ground, all the species frequent standing trees. They breed in dry dead branches, and are apparently absent from the wettest forests. No parasites are at present known to attack this genus. The unique type of *Chaenosternum* has much the appearance of an abraded *Acalles. Hyperomorpha squamosa* described (from a single specimen found near Honolulu) by Mr Blackburn, is probably an introduction. I have felt some doubt whether this may not be *Cryptorhynchus batatas,* an insect now common and attacking the sweet potato and other Ipomoeas, and itself not a true *Cryptorhynchus.* Another recent introduction is the mango weevil *C. mangiferae,* already after a few years' occupation, only too abundant on Oahu.

Sphenophorus obscurus is the well-known 'cane-borer' of the Hawaiian islands, a most injurious species to sugar cane, but breeding also occasionally in bananas and various palm trees. The Hawaiian and Tahitian form, introduced originally into Maui from Tahiti, and later still reaching Fiji, is a different race from that found in New Guinea and the Moluccas, the New Guinea form having also been imported into Australia. The three species of *Calandra* are introduced, and include the common rice-weevil, the tamarind weevil (*C. linearis* var. *striata*) and a more remarkable species, *C. remota.* This latter is usually found in banana stems but also sometimes occurs in those of coconut trees on the coast near Honolulu.

The Cossoninae contain the most important and numerous genera and species of Hawaiian weevils. The genera *Deinocossonus, Nesotocus, Dysomma, Heteramphus, Oodemas* and *Anotheorus* are endemic, while *Orothreptes* though not at present known from elsewhere, will probably prove apodemic. There are 17 species of *Drophthorus,* one of these *D. distinguendus* being probably apodemic. The rest are true natives. *D. distinguendus* is common in the town of Honolulu, often riddling boards, or wood that is laid upon the ground in gardens. It is also very widely distributed throughout the forests. Most of the species are polyphagous, their larvae attacking many kinds of dead wood, either that of still standing trees, or of rotten logs lying upon the ground. Some species, however, are more particular. *D. oahuensis* is usually found in the dead wood of standing trees of *Pipturus,* and *D. pusillus* inhabits decaying tree-ferns. *D. modestus* is also rarely found in the latter, as well as in many kinds of dead wood, hard or decayed. The species are difficult to separate, and frequently colonies of several species are found mixed. The remarkable little insect, for which I made the genus *Thalattodora,* supposing it to be a natural immigrant, proves to be such, and is elsewhere known from Florida and Australia. It is *Dryotribus mimeticus* of Leconte and Horn. It is interesting to find that this beetle has presumably at some distant time reached the small and remote lying island of Midway, and there has given rise to an allied species. It is not known whether typical *D. mimeticus* occurs there also. Examples from the main islands of the Hawaiian group are in no way distinguishable from American specimens.

Of the three described species of *Pentarthrum*, *P. obscurum* and *blackburni* are certainly introduced, the latter attacking boxes of foreign wood in Honolulu, and the former is, I believe, also known from Fiji. It attacks trees of foreign origin. Another species of *Pentarthrum* has recently been imported and lives in the stem of sugar cane. *P. prolixum* on the other hand is truly endemic, found only in the mountain forests, and confined to the native tree-ferns. It exhibits considerable variability. *Orothreptes callithrix* is widely distributed in the islands, and the genus, if not the species, will no doubt be found elsewhere. It is attached to the naturally present, but not endemic tree, *Pisonia umbellifera*. The minute weevil, *Deinocossonus nesiotes*, is found on various kinds of dead wood, *Metrosiderus*, *Alyxia* etc. It is confined to the native forests, from 1500 ft. to 4000 ft., and shows considerable variability. The natural immigrant in drift wood, described by me under the name of *Haloxenus immigrans* (Vol. II, p. 148), belongs to the genus *Macrancylus*, originally described from Florida. *Pseudolus longulus*, which we have found in consignments of plants from Fiji, is no doubt an imported species. *P. hospes*, of later introduction, and first found in the boards of the floor of a room in Honolulu, is now far commoner in the mountains round the city than *P. longulus*. Where the latter was once common one now finds only *P. hospes*, as if the latter had in some way dispossessed the other. *Phlaeophagosoma tenuis* is also an importation, which in recent years we have found amongst Fijian plants, when inspecting these on their arrival at the wharf. The genus *Nesotocus*, with four species, is a very remarkable endemic form, included by Champion in a small group of Central American genera, distinct from, but allied to the Cossonini. Sometimes these insects are not rare beneath bark or in crevices of the limbs or trunk of *Cheirodendron*. Whereas in drier districts, e.g. at Kilauea, Hawaii, the beetles remain concealed and at rest during the day, in very wet and dense forests, like those of some parts of Puna and the Kohala mountains, they are active by day, running rapidly over the tree trunks like many Longicorns. Dead branches of *Cheirodendron* are often riddled by the borings of these species. Individuals vary greatly in size, and, in accordance with this, the structure is much modified in the small examples, the form of the rostrum, antennal joints etc. becoming affected. *N. kauaiensis* is remarkable in having the antennae of the ♂ inserted in a different position on the rostrum from that of the others, though otherwise excessively closely allied. *Dysomma sylvicola*, only once found amongst dead leaves, is of uncertain affinity.

The 10 species of the genus *Heteramphus* are of great interest. They seem to be best represented on Oahu, which yields five of the known forms. *H. filicum* is common in decayed parts of the stems of tree-ferns in the mountains near Honolulu. It exhibits a good deal of variation, and different colonies apparently sometimes differ considerably in appearance. *H. wollastoni*, *foveatus* and *cylindricus* are all common on the liliaceous plant, *Astelia*; sometimes all are found in company on a single plant, sometimes two of the species are mixed, sometimes only one occurs. On one occasion a single plant yielded not only these, but *H. hirtellus* as well! It is very remarkable to find all these species living absolutely together, and with perfectly distinct specific characters, when we must suppose, that all originally were the product of a single form. In spite of apparently an identical mode of life, species formation of the most distinct kind has taken place. Of the four species, *H. cylindricus* exhibits much variation, the others are much more constant. *H. haleakalae* and *H. frater* are found beneath rotting logs in the same locality and may not be distinct species; *kauaiensis* has the same habit, and *molokaiensis* was found in wet moss on tree-trunks.

Oodemas is a remarkable endemic genus with 48 described species, with others known, but undescribed. The species are extremely difficult, many of them being variable, while some exhibit marked sexual differences and others little or none. The larvae of all feed on dead wood or ferns, excepting *borrei*, which is common beneath stones, where only a scanty vegetation of grass-tufts and a few low plants exist. *O. brunneum* is found in dry frond-stalks of *Pteris*. Many of the species, like *O. aenescens*, are polyphagous, attacking the dead wood of many kinds of trees. In fact this species and some others are even found in stems of low plants. Others, however, are either solely attached to one sort of tree, or, at least, are rarely found on more than one. Some of the species, e.g. *O. corticis*, *O. nivicola* and *O. multiforme*, are very numerous in individuals and many of the species are gregarious, so that a number of examples may be found in proximity. Many, however, are difficult to collect and are still very imperfectly known. No parasites of these beetles are at present known, but they are a favourite—perhaps the favourite—food of several species of the remarkable birds of the genus *Heterorhynchus*, and the allied *Hemignathus* also devours large numbers of them.

Anotheorus with three species is allied to the preceding. *A. montanus* breeds in the dead wood of *Aleurites*, *Acacia koa*, *Pisonia* etc. in the mountains just behind Honolulu and elsewhere on Oahu. It appears to have become very much more abundant of late years than was formerly the case. Once difficult to obtain, it is now a common beetle, and is sometimes found in company with the introduced *Pseudolus hospes* and *Dryophthorus distinguendus*.

SCOLYTIDAE.—Three genera with 24 species are considered in this work, but one or two other genera are now represented by recently imported species. Of the 19 species of *Xyleborus* two of the most abundant, *X. confusus* and *X. pubescens*, are introductions by man, and one or two of the other species are very likely to prove to be foreign. *X. pubescens* (*immaturus* Bl.) is an injurious species, attacking trees that are temporarily unhealthy, and in that case sometimes causing their death, when otherwise they would no doubt recover. It may be seen in vast numbers breeding in trees that are scorched by forest fires, and is sometimes common in the city of Honolulu. It has also been introduced into Queensland, where it was observed in myriads in felled timber in one locality, and no doubt it will become ubiquitous throughout warm countries, wherever the climate is suitable. The native species are very difficult to distinguish from one another, and there is great sexual dimorphism, so that it is not possible to associate the sexes in the present state of our knowledge. The males are usually much rarer than the females, and large colonies of the latter may be found without a single example of the former sex. One group of large-sized species is attached to the tree *Cheirodendron*. Others attack *Acacia koa*, *Pipturus* and other trees, while the introduced species are partial to *Aleurites triloba*, the apodemic 'Kukui' tree. For most of the endemic species a tree has to be in a particular condition of decay or disease in order to be attacked. The species of *Hypothenemus* are, doubtless, all introduced. *H. eruditus* is sometimes found in the covers of books, as in other countries, but it also breeds very freely in the open, in dry stems of many plants, and in the twigs of many bushes and trees. It is parasitized by a minute Bethylid, probably a *Cephalonomia*. *H. insularis* and *H. ruficeps*, described by me, are varieties, I believe, of this variable species. *H. maculicollis* is often found with *H. eruditus* and is very common in twigs of tamarind, Hibiscus, and many other trees and plants. It is also fond of boring in the trunks of large avocado pears (*Persea*) when these are not quite healthy, and aggravates their condition. *Crossotarsus externedentatus* sometimes joins in the attack on this tree and becomes very numerous. The species of *Hypothenemus* are mostly confined to the lowlands or lower elevations rarely attaining an elevation of 2000 ft. in the mountains.

ANTHRIBIDAE.—Represented by only foreign forms, unless, as is improbable, *Araeocerus constans*, which is very closely allied to the introduced *A. fasciculatus*, should prove to be endemic. It is very common in the Kona district of Hawaii, frequenting the flowers of *Argemone mexicana*. *A. fasciculatus* is one of the commonest of beetles, breeding in immense quantities in the fruits or seeds of many native and foreign trees, and also in dead wood, dry stems of sugar cane etc. It is occasionally parasitized by an *Eupelmus*. It ranges from the coast, throughout the mountain forests of all the islands. Of recent years two or three exotic Anthribids have become imported and established. These belong to the common tropical genera that have the antennae greatly elongated. One of them we have found swarming in consignments of coconut drupes imported for seed.

PROTERHINIDAE.—This family, excepting for a single species, which inhabits Samoa, is at present only known from the Hawaiian group. Here about 130 species have been recognized, and these form an assemblage exhibiting great variety of structure. The discrimination of the species is a matter of very great difficulty owing to the variability of many of them, and which are true species and which mere local forms or varieties is very incompletely understood. It is quite certain that many of the species apart from great variability in examples taken in the same locality, also exhibit local variation, and further some are known to vary according to the nature of the food-plant. There is often great variability in the size of the individuals of a species, and concomitantly with this, the structural characters become modified. Some of the species are polyphagous, feeding in the dead bark of widely different trees. Thus *P. vestitus*, which may be considered the type of the genus, is found on the Kukui, *Aleurites* (Euphorbiaceae), on *Pipturus* (Urticaceae), on *Charpentiera* (Amarantaceae), etc. This species does not show any particular variation in accordance with the food-plant. Other species, on the contrary, such as *P. oscillans* and *P. laticollis*, are attached only to one species of tree, those just mentioned breeding only on *Acacia koa*. Stragglers may be found accidentally on other plants, having become dislodged from their proper habitat; and even at some distance, when, after high winds, by which branches or twigs are detached and carried to a distance, the beetles leave these in search of a proper breeding place. Several species, e.g. *P. longulus*, are found only on tree-ferns, while *P. pteridis* is attached to *Pteris* and *P. sharpi* to an undetermined, but not arboreal, fern. A few species leave the stems to feed on growing leaves of the trees they affect, and some form burrows in the leaf stalks. Many of the species are gregarious and it is a common occurrence to find a dozen or even many more individuals resting side by side beneath dead bark. Sometimes quite different species are associated together in these flocks. The apodous larvae are often found feeding in the bark, beneath which the adults congregate, but some enter the solid wood of hard trees, while some breed in the leaf-stems of ferns. *Proterhinus* is ubiquitous throughout Hawaiian forests, where any native Coleopterous fauna remains, and ranges above these to a height of 9000 ft. or more on the higher mountains, affecting the shrubs that grow at high elevations. They entirely cease to exist in the lower forests, where these are well occupied by the ant *Pheidole megacephala*, which rapidly exterminates them. Doubtless, there has once been a considerable number of species, inhabiting areas at lower elevations, which are now extinct. Not a single species is now known from the coastal region of the islands, though the Samoan species was found in coconuts, that had been grown on the coast, in that group. It is probable that numerous species remain to be discovered outside the Hawaiian islands, and possibly some forms will be found connecting *Proterhinus* more closely with the New Zealand *Aglycyderes*.

Apart from size, colour and clothing, the variation that has been noticed to exist in individuals of colonies of *Proterhinus* affects the size of the eyes, length of antennal joints, the shape of the pronotum and the development of the humeral angles of the elytra. As all these characters have to be used for the differentiation of the species, it may readily be understood, that years of study may be necessary before a satisfactory elucidation is attained. With regard to the variation in the individuals of the colonies mentioned above, it is worthy of note that we have found in the case of some species that whereas the individuals of one colony exhibit no variation of note, in another colony may be found examples so variable that, had the extreme forms been found apart, one would have hesitated to consider them as belonging to a single species. Whether this is due to the mating of similar parents in the one case and of dissimilar ones in the other can only be settled by experimental breeding in the homes of the insects. They do not thrive if removed from the forests, and may even be affected in superficial characters, when bred on the lowlands. Thus a series of *P. vestitus* reared in Honolulu could not be matched in colour by any of many specimens gathered from the very same trees at an elevation of about 2000 ft. in the mountains.

OEDEMERIDAE.—*Oxacis collaris* described from the islands, is certainly an importation and has often been seen in great numbers on foreign trees and shrubs about the town of Honolulu, and of recent years has spread throughout the island of Oahu. Doubtless, it will reach the other islands, if it has not already done so; sometimes it is extremely abundant at light. It sometimes visits certain flowers in the daytime, and at a time when many of the shrubs in Honolulu were covered with the Coccid, *Ceroplastes rubens*, it literally swarmed over the foliage, probably attracted by the excreted honey-dew. Quite recently one, if not two other Oedemerids have been imported into the islands, but have not yet become generally abundant.

ANTHICIDAE.—The two species of *Anthicus*, which frequent the neighbourhood of the coast may be natural immigrants, being widely distributed in the islands, and one of them, at least, is very abundant. *A. oceanicus* has been recorded from the Marquesas.

CISTELIDAE.—The genus *Cistela* contains seven described endemic species, and *Labetis* with five is supposed to be endemic. The species of *Cistela* are closely allied and difficult to determine and as a rule not numerous in individuals, so that they have been imperfectly studied. They appear to be diurnal as they are found on the foliage of trees and on ferns in the daytime and occasionally are seen on the wing, as is the case with the *Labetis* of Kauai. The species of the latter genus that occurs on Hawaii, however, is nearly always found resting beneath the bark of *Acacia koa* in the daytime, several examples being sometimes found in company and we do not remember seeing it active in sunshine like the others. The species are extremely closely allied and the larvae are not at present certainly known, but Tenebrionid-like larvae, superficially somewhat similar to those of some Eucnemidae and found with these are probably to be referred to the Cistelidae.

TENEBRIONIDAE.—The seven genera recorded are of little interest, most of the species being certainly importations, but four *Epitragus diremptus*, *Platydema obscurum*, *Opatrum seriatum*, and *Sciophagus pandanicola* are possibly natural immigrants. The latter now seems to be rarely or never found. There are a few other Tenebrionids now present, of quite recent introduction. *Alphitobius lateralis* appeared on Oahu about 20 years ago, and has since spread and become one of the commonest of insects. The larva of *Opatrum* is not infrequently found in the soil beneath the droppings of cattle, and is probably predaceous on the Diptera so abundant in these.

CIOIDAE.—The 42 species representing this family have been placed in two genera, the apodemic genus *Cis* having 29, and the endemic *Apterocis* 13 species. They are a varied assemblage of forms, and will probably at some time be split into more numerous genera. *Cis pacificus* is a very commonplace species, as compared with its congeners, and resembles foreign forms. It is very common in foreign fungi growing on trees that are not endemic, and I suspect it will itself prove to be foreign or an importation. One or two other species are likewise doubtfully native. Very few of the Hawaiian *Cis* are found in the larger fungi that grow out from the trunks of trees, but *Cis roridus* and *bimaculatus* are found in these, though not confined to them. Most of the species live beneath bark of trees, feeding on the smaller or microscopic fungi that grow in this situation. *Cis laeticulus* we have found, both mature and larval, on dead fallen leaves of *Freycinetia*, the larvae no doubt feeding on the fungi growing on these. Many of the species are widely distributed throughout the islands and very numerous in individuals, and they also exhibit much variability. Some of the species of *Cis*, as also all of those belonging to *Apterocis*, are flightless. With regard to the former it is not certain whether some may not have fully-winged and flightless individuals as well. One or two of the species referred by me to *Apterocis*, I believe, from more recent examination, to be fully-winged and they should be transferred to *Cis*. The Hawaiian forms are a very interesting series and particularly require close observation in the field and need still more to be bred in captivity, in order that the limits of variation of the species may be correctly determined. Some of the wingless Bethylids (*Scleroderma*) are sometimes bred from wood containing these beetles, but it is not certain whether they are parasitic on them, or on other insects (especially caterpillars) found in the same wood. The minute Braconid, *Echphylopsis nigra*, is also obtained from wood in which these and other small endemic Coleoptera are breeding. The abundance of the beetles and the comparatively great rarity of these parasites show that, if parasitic on *Cis*, the latter are of little effect in reducing the numbers of the former.

BOSTRICHIDAE.—The six species, each belonging to a different genus, are all introductions by man. They are none of them forest insects. Some of the species are very injurious to felled timber, whether destined for fire-wood or for other purposes, reducing the wood in time to a powdery condition, by their numerous burrows. *Bostrichus migrator* Sh., a species we have found in Mexico, has proved destructive to wooden tanks and even to the wood of some houses. *Xylothrips religiosa* and, I believe, some of the other species are attacked by the introduced Braconid, described by me as *Hormius* (?) *peregrinus*, which apparently really belongs to the little known Helconine genus *Euscelinus* of Westwood.

LYCTIDAE.—Two imported species of *Lyctus*, one being the well-known European *L. brunneus*, are of no particular interest. We have seen *L. brunneus* in great numbers beneath the bark of large trees injured by fire.

ANOBIIDAE.—The imported insects of the genera *Catorama*, *Anobium* and *Lasioderma* are importations by man and of no special interest, except to the economic entomologist. *Holcobius* with 12 and *Xyletobius* with 52 species are endemic and allied to one another. The species of the former are nocturnal, those of the latter diurnal and sun-loving, and often seen in numbers basking on the leaves of forest trees. *Holcobius* may be found sitting near their burrows on the trunks of dead trees after dark. Some of the species of *Xyletobius* are very abundant and of wide distribution. They breed in dead wood as a rule, but some of the species have been taken ovipositing in sickly trees, which, however, were by no means dead. It appears that some and perhaps many of them are particular in their choice of food, feeding only on one species of tree. Some of the larger species are known to be parasitized in the larval condition by the Encyrtid genus *Eupelmus*, and they are occasionally found in the stomach of insectivorous birds. They do not thrive in the densest wet forests and sometimes are quite absent from these, but are most abundant in more open and drier woodlands. In their company one frequently finds the endemic Dermestidae which seem very regularly to be associated with them, and sometimes considerably resemble them in superficial appearance. The definite variations in the pattern of many *Xyletobius* is of an interesting nature[1]. Sometimes these distinct varieties of a species are all found in company, but sometimes they appear to be of local occurrence. The larger insects of the genus *Holcobius* are sometimes found on tree ferns, but it is not known whether they breed in these. Some species have been bred very freely from very dry dead wood, e.g. from posts used as supports of an outhouse. Occasionally examples are attracted to light at night.

The species of *Mirosternus* are very numerous, no less than 70 apparently distinct forms having been distinguished. The discrimination of the species is extremely difficult, since many are closely allied to one another, some are variable, and whereas some present extreme sexual differences, others hardly differ in external sexual characters. Consequently the number of species given is likely to need some modification. In their habits the *Mirosternus* resemble *Xyletobius*, being sun-loving insects, and very sparsely represented in the wettest or densest forests, but in more open woods some species are very numerously represented. Many of the individuals, that are dislodged by beating bushes, take wing and may sometimes be seen beating up against the wind to regain their position. They are often observed in numbers on the upper side of the leaves, remaining motionless, rarely active. Only a fraction of the number of known species, however, occurs in profusion, many being very scarce. They breed in dead wood, and when the bark is stripped from dead Koa trees, one sometimes finds the remains of thousands of examples beneath this. They chiefly affect the same trees as the species of *Xyletobius*, and in fact are generally taken in company with these. It is not definitely known whether they are attacked by parasitic Hymenoptera, but it is most probable that the small Chalcids of the family Miscogasteridae, which parasitize other small Coleoptera, affect them also. They are sometimes found in the stomach of native Drepanidid birds, but not as commonly as are the brassy weevils of the genus *Oodemas*. Species of endemic Dermestidae are very commonly found in company with *Mirosternus*, and some of them superficially resemble the latter in appearance. Although described first from the islands, *Mirosternus* is now known to inhabit tropical America, and the Hawaiian forms are probably derivatives from a very ancient introduction from that region.

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[1] See Plate XVI, figs. 11—16, for varieties of *X. proteus*.

CLERIDAE.—Represented only by three widely distributed species, introduced, no doubt, by man. The two species of *Necrobia* (*rufipes* and *ruficollis*) are often abundant in the remains of dead animals, but *Tarsostenus univittatus* does not seem to flourish in the islands. It is generally found on dead posts bored by various xylophagous beetles, and we have only seen it at large at night time.

MALACODERMIDAE.—*Helcogaster pectinatus* has been found only in and around houses in Honolulu, and we once observed a small swarm of males, entering a room through the meshes of the mosquito blinds covering the window. Probably they were attracted by a female somewhere within the room, but the latter was not observed.

Caccodes debilis is likewise a Honolulu insect, generally found in or close to houses, but once observed in a plantation of foreign trees a few miles from the town. Both these species, sole representatives of the Malacoderms, are, doubtless, importations, though not yet known elsewhere.

ELATERIDAE.—Five genera, each represented by a single species, are certainly importations. Of these *Melanoxanthus melanocephalus* is often seen in the windows of stores in the town of Honolulu, but is also found in the country. *Adelocera modesta* is common on Oahu, but during the period of my systematic collecting was not observed on the other islands, though it may now have reached some of these. *Simodactylus cinnamomeus* is generally distributed throughout the group, the beetles being often observed in numbers at the bases of leaves of liliaceous and other plants, and also on flowers, while the larvae are found in decayed wood, stems of sugar cane, &c., and are known to be at least partly carnivorous. The large *Chalcolepidius erythroloma* is sometimes numerous on Oahu, especially near Honolulu, but has not, so far as is known, yet reached the other islands. It is commonly seen at the sap oozing from fungus-attacked trees in the lower forest, especially on the Koa and Kukui, and the larvae occur in the dead wood of the latter. We have also found these in the wood of living orange trees, once in such numbers as to be apparently doing injury, but the trees were sickly.

Monocrepidius exsul is the latest importation in the Elateridae, it having been first noticed in 1900, and now is the most plentiful of this family on Oahu. It is attracted to light on dark nights in extraordinary numbers, especially in the vicinity of cane-fields, where it breeds in the trash.

Eopenthes is an endemic genus with 33 described species, many of which are rare and imperfectly known, the species being extremely hard to distinguish. Some have a constant colour pattern, while others are very variable. In the latter case individuals of one species may be of two or three quite distinct patterns of colour, these same colours being of specific value in other species and not varying. These beetles are remarkable amongst the Hawaiian Coleoptera for several reasons. They are almost entirely summer insects or at least do not occur between November and March. They are almost the only native beetles found visiting flowers for the sake of the nectar, being especially fond of the blossoms of *Metrosiderus*. They are also largely of diurnal habits. Unfortunately many of them appear to be rare or this may be partly due to their comparatively short season, on account of which the travelling collector does not happen to be in the right place at the right time.

Eopenthes konae, a very variable species, is very abundant and widely distributed on Hawaii and is found in all sorts of situations, even under stones. The larvae are common objects in the forests of all the islands, being found in rotten wood, and are often seen in numbers, when adults are rare, or not observed at all. No parasites were obtained from the few I was able to rear.

Itodacnus, another endemic genus with eight species, is nocturnal in its habits, or at least some of the species are so, and *I. gracilis* may be seen on the wing in numbers at dusk. In the daytime they hide beneath the bark of trees, sometimes a considerable number in company. The larvae also have been found beneath bark, and the adults are attracted by light. *Dacnitus*, with a single species, is probably a terrestrial species. It was only once found beneath a log on very wet mud, in a boggy forest. It is allied to *Itodacnus*.

The Eucneminae are represented by 33 endemic species of *Dromaeolus* and a single one of an endemic genus *Ceratotaxia*. They have been even more imperfectly collected than the true Elaters, and as in these, the larvae are more numerous than the adults. Unless found full grown, these larvae generally die if removed to the lowlands, and no beetles are raised. They are, however, easily reared in the forest region and until this has been extensively done, the species are likely to remain uncertain. The adults are usually found beneath the bark of trees, or, when just freshly emerged, in logs or the dead stems of growing trees, where the larvae have fed. Some like *D. perkinsi* can bore into the hardest wood, others like *D. obscurus* have been found in the wettest and softest of rotten logs. Some occur in the moss on tree trunks, and a few species are, but very rarely, taken on the wing in the sunshine. Some of the species are wingless. They are not partial to flowers, like *Eopenthes*. *Acacia koa* is a favourite tree with this genus, and a number of species are attached to it. On old koa trees great quantities of the remains of these beetles are often seen beneath the bark, probably in evidence of many generations having bred therein.

BUPRESTIDAE.—Unrepresented in the native fauna, but with three imported species established. Two of these are common North American species of *Buprestes* and appear not to thrive in the islands. Perhaps they are not really established, but are brought in from time to time with the heavy shipments of lumber. An obscure *Agrilus* attacking leguminous trees, probably more or less unhealthy, was so abundant in 1900, as to appear to be an injurious insect near Honolulu.

SCARABEIDAE.—*Trox scaber*, *Aphodius lividus*, three species of *Ataenius* and *Saprosites pygmaeus*, an undetermined *Psammobius* and *Adoretus tenuimaculatus*, all imported by man, alone represent this large family. The latter, introduced from Japan about 1896, is an injurious insect, and for a time defoliated many ornamental plants, and threatened to destroy some of the forest trees. Afterwards becoming attacked by a fungous disease, and this being artificially spread, it ceased to become so serious a pest, though always numerous. Subsequent to its introduction, we have found the larva abundantly in soil contained in boxes of plants brought from Japan, when inspecting introduced plants just landed from a steamer from Yokohama.

LUCANIDAE.—Represented only by the endemic genus *Apterocyclus*, found only on Kauai, where seven forms have been distinguished. All these forms were collected within an area of a few square miles and their specific distinction seems uncertain. The larva has been found in and beneath rotten wood, and a newly emerged beetle was once taken in a rounded cavity in the soil beneath cow-dung in an open place away from trees or fallen wood.

DERMESTIDAE.—The allied genera *Labrocerus* with 18, *Argocerus* with two, and *Eocerus* with a single known species are all endemic and of considerable interest. Some of the species are quite common and we have always found them in places frequented by, and usually in company with, Anobiidae, and there is probably some real connection between the two, though their habits are not known. Like the Anobiidae they sometimes frequent the foliage of plants, and some of them have a striking superficial resemblance to certain species of the former. These superficially similar species in the two groups are sometimes actually found in company. On one occasion an Anobiid was found far below the usual range of these insects, near the coast, and even in this case a *Labrocerus* (*L. curticornis*) was found on the same tree. It seems possible that the larvae of these Dermestidae prey on the Anobiidae. Larvae of Dermestids beaten from dead branches of trees in the forests, no doubt belong to *Labrocerus*.

Attagenus plebeius is often found in houses, and is certainly introduced, as also are the two species of *Cryptorhopalum*, both of which are found in Honolulu and probably all over the islands, on the lowlands. The larva of one species is often noticed on the sheath of dead palm leaves, when these fall from the trees. The two species of *Dermestes*, common introduced species, are abundant in carcases of dead animals, and range to high elevations in the mountains.

Coccinellidae.—Only four species of this family occurred in the islands twenty years ago, but since that time numerous genera and species have been imported for economic reasons. These have now, many of them at least, become the commonest and most ubiquitous of insects. The four species found by Mr Blackburn, all still occurring, are, doubtless, importations by accident, excepting perhaps *Scymnus ocellatus*, which might be an immigrant. I have been told that this species is identical with a species in the Galapagos Islands. *S. discedens* Sh. appears to be the *S. debilis* of Leconte and *S. vividus* Sh. is said to be *S. loewii* of Mulsant. *Cycloneda abdominalis* is certainly much less numerous than was the case twenty years ago, but now it has to compete with a number of other introduced species, which have the same food and are far more successful.

Erotylidae.—Represented only by *Euxestus minor* not known from elsewhere, but probably an importation, as it has only been found on Oahu, and by *Eidoreus minutus*, which has been found actually in Honolulu, and is very unlikely to be endemic.

Corylophidae.—The five genera of this family contain, so far, only six species, which are all known only from the islands at present, and four of these have only been found on Oahu, mostly near Honolulu. *Sericoderus pubipennis* and *Orthoperus aequalis* are of wide distribution throughout the group, in the mountains, and are found in fungi on Koa and Kukui trees, but it is probable that these, as well as all the others, will be found elsewhere. These others belong to the genera *Sacium*, *Anisomeristes* and *Corylophodes*, the latter with two species.

MYCETOPHAGIDAE.—Of the two species of *Litargus*, *L. balteatus* is American, and *L. vestitus*, though described from the islands, will doubtless prove to be foreign, as it has been found out of the range of endemic beetles on foreign trees. I think that both species occur in the town of Honolulu at times, and one or other species of the genus sometimes abounds in decayed stems of sugar-cane. *Propalticus oculatus* is also certain to prove an introduction, for though it occurs in the forests, we find it in the town of Honolulu, sometimes in dead stems of introduced *Hibiscus*. *Typhaea fumata* is of course an importation.

MYCETAEIDAE.—Represented only by the introduced *Mycetaea hirta*, and it is uncertain whether this has become established.

LATHRIDIIDAE.—Only represented by the foreign *Lathridius nodifer* and *Colovocera maderae*, the latter first observed in 1900 in foreign ants' nests, in and close to Honolulu. *L. nodifer*, though widely distributed, only occurs in very small numbers, usually amongst fallen leaves in the forest.

CRYPTOPHAGIDAE.—*Cryptophilus integer* an introduced species, found in Honolulu, and the European *Henoticus serratus*, also, no doubt, imported, are the only representatives of this family.

CUCUJIDAE.—This family is of more importance than the several preceding, though six of the eight genera represented are represented probably by only foreign species, importations by man. *Brontolaemus* is an endemic genus with four closely allied species, showing considerable variation, and they are mostly difficult to distinguish. They are nearly always found on trees affected by the longicorn beetles, especially *Clytarlus* and *Plagithmysus*, occasionally on the Kukui tree (*Aleurites*) when the foreign longicorn *Oopsis nutator* is breeding therein. The six described species of *Parandrita* are still more difficult to separate and are imperfectly known owing to the rarity of most of the species. They apparently have the same habits as *Brontolaemus*, but usually occur singly or only one or two examples together, whereas examples of the latter are frequently found in some numbers together.

Laemophlaeus minutus is an imported species and may be found in Honolulu beneath the rind of *Hibiscus* and other trees attacked by other beetles. It is often very common in stores in Honolulu, being numerous in rice and other produce, in company with the usual insects affecting such produce.

Psammoechus insularis and other species of the genus as well as *Monanus* have been found in plants imported from other countries and, doubtless, are all introductions by man, while *Cryptomorpha desjardinsii* comes under the same category. It is an extremely common beetle, very partial to banana plants. The representatives of *Cathartus*, *Silvanus* and *Nausibius* are also importations and of no interest.

Colydiidae.—*Antilissus* is an endemic genus with only one species (*A. aper*). It is an abundant forest insect, and very widely spread throughout the islands, found usually beneath bark of *Straussia*, often many individuals in company. *Glyptoma blackburni*, a Staphylinid, frequently lives with it, and the larvae of both occur with the mature beetles. It shows some variation, but being so different from any other Hawaiian insect, this is not usually noticed. This is the only native Colydiid.

Minthea rugicollis and *Colobicus parilis* have been found in or near Honolulu beneath bark. The latter first appeared about 1900, and became very numerous on the trees killed or injured by fire in the conflagration that took place in cleaning up the city, during an epidemic of plague. The minute beetle *Derolathrus* was first found about the same time, but only in trees on the edge of the road round Mt Tantalus, where house-building was being actively engaged in, and much lumber carried up. It was common, and has since spread to some extent.

Discolomidae.—The single species of *Fallia*, very closely allied to a Central American species, will probably prove to have been introduced. It has been found in the common hard fungus on trunks of *Aleurites* (though not confined to these), and like the fungus itself and the few other beetles found therein is no doubt foreign.

Trogositidae.—Represented only by *Tenebroides mauritanicus* a cosmopolitan and imported species.

Monotomidae.—Represented only by *Hesperobaenus capito*, usually found in the mountains, but once found in Honolulu in decayed sugar-cane. It occurs all over the islands and is sometimes numerous in the inflorescence of *Freycinetia*, in company with foreign Nitidulidae (*Haptoncus tetragonus*) and also with native species of that family. The larvae occur on the *Freycinetia* with the adult.

Nitidulidae.—This family is extremely richly represented by 138 species that are endemic, and a few introduced forms. Excluding the latter there are 13 genera, all endemic, mostly evidently related to one another. Those of which the relationship to the others is doubtful (*Notopeplus* and *Cillaeopeplus*) contain only three or four species in all. A considerable variety of habits is exhibited by the Hawaiian series, so that the allied forms have occupied most situations in the islands, that are affected by these insects in other parts of the world. A few species are terrestrial, living amongst decaying leaves. These are excessively sluggish, and have the size of the eyes reduced and are flightless (*Apetinus explanatus*). The four flightless genera have arisen independently from winged forms, and are not closely allied to one another. So far as at present known they contain few species, only nine in all having been discovered.

The species of *Goniothorax* and *Gonioryctus*, with nine and twenty-four species respectively, show considerable diversity of habits, some frequenting the fleshy inflorescence of *Freycinetia*, others living at the base of the leaves of this plant or *Astelia*, the fresh flowers of which are attractive to the adults; some are found in flowers of Lobeliaceous plants, and breed in the almost liquid, decaying stems of these trees, of *Cheirodendron* and others; some live and breed beneath the bark of hard-wooded trees like *Acacia koa*, and others in decaying tree-ferns. The flightless species of *Nesapterus* have the habits of the latter. The species of *Orthostolus* breed in the semiliquid mess or exudations beneath the bark of Lobeliaceous trees or others. Several are attached to *Acacia koa* and usually a number of examples, from three or four to a hundred or more, are found in company. *Apetinus* is either terrestrial, or found beneath bark of decaying branches. *Eupetinus* contains 24 species, and is allied to the preceding, but fully winged. Many of the species are very common insects and the individuals vary much, so that the specific distinctions are extremely difficult to make out. I spent a great deal of time in the collection of colonies of species of the '*impressus*' group in order to try and understand the limits of variation of these, but owing to apparently distinct species being found together and the variability of all, I was not able to arrive at any satisfactory conclusion. The individual species show a good deal of variation in their habits, breeding in quite different plants. Most of them are attached to dead wood, or to fleshy flowers and decaying inflorescences, and a few to tree-ferns. All are very sluggish, and it is seldom that one is seen on the wing, but possibly they are nocturnal in their activities. The large genus *Nesopeplus* with 32 and *Nesopetinus* with 25 species seem closely connected by some of their forms, and the latter has species evidently connecting with *Gonioryctus*, so that in collecting I always supposed them to be small species of the latter genus. This is the case with the common *N. tinctus*, which is sometimes found with *Gonioryctus* on flowers of *Astelia*. Some of the species of these large genera have habits like those of *Eupetinus* and are found in company with them on Lobeliaceous flowers and *Freycinetia* and also in fruits of forest trees, but others frequent small inconspicuous flowers, e.g. those of *Kadua*, and even the larvae have been found in these. Some are evidently very particular as to the kind of tree they frequent, or are entirely restricted to one kind, but others are much less fastidious. Some breed in rotten stems of tree-ferns. Many of the flower-frequenting species do not breed in the flowers, but only resort to these for food, apparently eating the pollen, with which they are sometimes quite covered. The Ohia flowers, with their abundant nectar seem to be rarely or never visited, though the beetles may be obtained from the dead wood. Many species are very abundant and they are very difficult to determine and will no doubt be much more so, when all that exist have been collected. *Notopeplus reitteri* is an isolated form, attached to the banana plant, in which it breeds, and is widely spread over the islands. It has been taken from tree-ferns, but its occurrence there may have been accidental. The minute, elongate and flattened species of *Cillaeopeplus* are found on various trees, beneath the bark. *C. infimus*, the best-known species, is not attached to one plant, as we have found it breeding in decayed parts of *Pisonia* and on the Urticaceous *Pipturus* and *Urera*.

The four species of *Carpophilus* are all importations, and are either domestic, or found in decaying flowers or fruit. *C. humeralis* and others are sometimes very abundant in rotten sugar-cane stems. Both the species of *Haptoncus* are also found in the latter and also in flowers and fruits, and are certainly introductions. No parasites have been obtained from any of the Nitidulidae, but they are sometimes killed by fungous disease, which is rarely epidemic. I do not remember to have ever found any Nitidulidae in dissecting the native birds.

HISTERIDAE.—The single species of *Carcinops* and two of *Saprinus* are certainly introductions, and the very minute beetles, *Bacanius atomarius* and *confusus*, found only near Honolulu by Mr Blackburn, may also be so. The species of *Acritus* 34 in number are probably all endemic, with the possible exception of *A. insularis*, which, found only near Honolulu, belongs to a different section from all the others. These are all found in dead wood or generally beneath dead bark, especially where there is moisture and decay. It is not known whether they are carnivorous, like most Histeridae, but as larvae of Mycetophilidae and Drosophilidae occur in the same places, it is quite likely that they prey on these. Some of these beetles are flightless, having rudimentary wings, others are fully winged, though we have never seen them expand these. It is usual to find several examples in company and these companies sometimes consist of two (and possibly more) quite distinct species. Owing to the nasty mess in which they often live, I have no doubt I neglected to take nearly as many examples as I might, because they foul and stick to other cleaner insects, and such creatures would be better collected apart or in alcohol. They are not really uncommon and are ubiquitous throughout the islands in the forests. *Aleurites*, *Acacia*, *Pipturus*, and especially *Cheirodendron* are some of the trees that they affect.

SCAPHIDIIDAE.—A single *Scaphisoma*, found only in the Waianae mountains of Oahu, represents this family. It is very doubtfully indigenous.

SILPHIDAE.—A single individual of *Clambus* found near the active volcano, to which there is much traffic, alone represents this family. It is probably an introduction.

TRICHOPTERYGIDAE.—I suspect that all the members of this family are foreign, for I have found two species in the town of Honolulu (one in decayed cane and one beneath bark of foreign *Hibiscus*) which are certainly importations. Some doubt may attach to the species of *Ptiliodes*, but two of these have only been found near Honolulu and the other which is found beneath Koa bark in the high forests of Hawaii and elsewhere, also occurs close to Honolulu. The other genera represented are *Actidium*, *Ptinella* and *Trichopteryx*, each with a single species.

Staphylinidae.—Of the tribe Piestini the genus *Thoracophorus* has two endemic species, one common and variable, ubiquitous over the islands, beneath dead bark of *Straussia* and sometimes on *Bobea*, the other apparently very rare and its habits not known, except that it is also found beneath bark. *T. blackburni* is excessively sluggish and often occurs in numbers together, in company with *Antilissus aper*. The single representatives of *Lispinus* and *Ancaeus* are both foreign, found in or near Honolulu, and, no doubt, introduced by man. *Lispinodes*, an endemic genus, is evidently rich in species, ten having been described by Dr Sharp, but individuals seem to be extremely rare. We have always found these in company with *Thoracophorus blackburni*, or more rarely with species of *Diestota* and *Myllaena*, but have only observed one example of *Lispinodes* to scores or hundreds of individuals of the other genera, on an average. They are always found beneath bark, generally where there is much moisture and decay.

The Oxytelini are probably unrepresented in the native fauna, unless one or other of the species of *Trogophloeus* prove to be endemic or naturally immigrant. From the habits of the Hawaiian species I do not feel sure that these could have been imported by man. On the other hand the four species of *Oxytelus* have certainly been imported.

In the Paederini *Lithocharis vilis* and the two species of *Medon* are probably importations, less probably natural immigrants, but the two *Ophiomedon* probably and three *Nesomedon* certainly are endemic. *N. brunnescens* is found in wet boggy forests under moss or bark and the others are true forest insects, probably of similar habits.

Of the Staphylini the four *Philonthi*, *Creophilus maxillosus*, and *Cafius nauticus* are foreign, whereas the three allied genera *Leurocorynus*, *Xanthocorynus* and *Holocorynus* are endemic genera, together containing only four species, all of which excepting the variable *Leurocorynus cephalotes* appear to be rare insects. I fancy that all are attached to the tree *Cheirodendron*, under the bark of which they live, sometimes larvae and adults together. *Leptacinus flavipennis* is an imported insect, found by Blackburn in Honolulu. Other Staphylinidae which prey on Dipterous larvae in cow-dung, like some of the *Philonthi* above mentioned, have been introduced for economic reasons, but it is not known whether these are established.

The greater part of the Staphylinid fauna is found amongst the *Aleocharini*, *Myllaena* with eleven species, *Oligota* with 28, *Liophaena* endemic and allied to the preceding with three, *Diestota* with 29, and *Eudiestota* and *Eusipalia* endemic and allied to this, with one each. All, or almost all, these species are endemic and of great interest. There are two species of *Atheta*, one imported, the other possibly so, though not known elsewhere. The species of *Phloeopara*, *Xenusa* and *Stenagria* are not likely to be endemic and are very probably importations.

The native *Myllaena*, *Oligota* and *Diestota* all exhibit much variety in their habits, but species of all of them are found in decaying trees beneath the bark, and we have found all together in a single tree Lobelia. Some of the species of *Myllaena* only occur under stones, especially on the edge of streams, others are found in the flowers of *Freycinetia* or Lobeliaceae with *Diestota*, Nitidulidae, etc. Some are only found beneath large decaying logs. The *Oligotae* besides occurring under bark of various trees are some of them specially attached to the foliage of plants, e.g. trees of the composite genus *Dubautia*. *Liophaena* appears to be partial to dry, or moderately dry, dead branches of trees especially *Acacia koa*.

There are a good many common species amongst the three large genera above mentioned, but they require special collecting and the very minute *Oligotae* are easily lost, unless a special bottle is carried for their reception. I have no doubt that I lost many individuals that I came across in general collecting. Some appear to be always found singly or one or two together, while some living beneath bark form little colonies. I once found a score or more of a brightly metallic species beneath a small piece of bark of *Acacia koa* on Kauai, but these must have been lost, as the species is not amongst those described. It is probable that the species of *Myllaena* found beneath logs and on the ground are flightless, excepting those that frequent the margins of the running streams and are very active.

HYDROPHILIDAE.—It is doubtful whether any of the few known representatives of this family are really native, though the genus *Omicrus* was described from the islands, and *Hydrobius nesiticus* and *semicylindricus* also are not known elsewhere. It is noteworthy that two of these species have only occurred on Oahu. *Cyclonotum extraneum* is certainly an imported species. The two species of *Dactylosternum* are also, doubtless, importations. The species of *Hydrobius* are of interest from the fact that the fresh-water fauna of the islands is so very scanty.

H. semicylindricus is a very abundant beetle and I think is sure to be found elsewhere. The fact that it has been found in artificial water-containers led to the suspicion that it was an importation by man, but the occurrence of a second species, far in the native forests, renders it possible that it is a natural immigrant.

DYTISCIDAE.—A single species of *Rhantus* and one of *Colymbetes* are ubiquitous in the mountain streams. Both exhibit variability and it is doubtful whether they are natural immigrants or whether they are really endemic. On the whole the former is the more probable; a closely allied species of *Rhantus* is found in the far distant island of Tahiti.

Carabidae.—This is one of the most important families of Coleoptera represented in the islands, no less than 210 species having been described, of which one only is at present known from elsewhere.

There is not the least doubt as to the endemicity of any of these species (excluding the introduced *Plochionus pallens*) excepting the other Lebiine, *Saronychium inconspicuum*, which I have no doubt is an importation, and the four species of *Tachys*, which are probably introductions by man. All of these latter are found on the lowlands amongst foreign insects, or else have only occurred in low mountain forests close to Honolulu. Of recent years at least two other Bembidiine Carabids have been imported and become fully established, and also another Lebiine.

Deducting all these, the native Carabid fauna consists of 204 described species all of which are endemic, while a good many additional species, as yet undescribed, are now well known. Restricting our remarks to this endemic fauna, we observe that all the species belong to the subfamily Harpalinae, and to three tribes in this subfamily, viz. Pterostichini, Anchomenini and Bembidiini. These are represented respectively by 76, 92 and 16 described species. The species of Anchomenini are distributed very unevenly in 24 genera, the Pterostichini in four genera (but of one only a single species is known), the Bembidiini in 8, but one of these contains 10 of the 16 species.

Many of the interesting features of the Hawaiian Carabid fauna are detailed by Dr Sharp (Vol. III, p. 175 *et seq.*) and, as I have had occasion to refer specially to these elsewhere, they need not be reconsidered here. The diminished chaetotaxy, predominance of flightless forms, and the relationship of the genera one to another in each group are of particular interest.

The adoption of the chaetotactic characters and those of the wings for the formation of genera is largely responsible for the large number of these that have been described. As Dr Sharp remarks (*l. c.* p. 186) "had I not adopted the condition of the wings and the thoracic setae as a basis for genera, our Hawaiian Carabidae would have appeared as members of only three or four genera. The other structural characters I have used for discrimination are extremely slight. This should be borne in mind, as the picture thus presented of three distinct groups, each consisting of a considerable number of closely allied forms, is fairly correct."

In the Anchomenini the genus *Blackburnia*, represented by only a single species and peculiar to Oahu, is remarkable for its sculpture. It is a heavy-bodied form, less active than most species, and is one of the comparatively few Anchomenines that is found beneath stones.

Deropristus has three species, one each on Oahu, Molokai and Maui. The two latter are not rare and are found beneath prostrate stems of tree-ferns or under logs, but the unique example of the Oahuan species is said to have been found beneath a stone. I once found a single individual of this or an allied form under a stone on a ridge in the mountains near Honolulu, but being called from my room, I left the beetle on the table and when I returned after a short absence, it had been carried off by that household pest, the ant *Pheidole megacephala*, and I was unable to trace it or to find another specimen.

Atrachycnemis is only known from Maui and Molokai, and has the habits of the *Deropristus* of those islands; in fact they are sometimes found in company, but individuals are not numerous. *Auchotefflus* is only known from Kauai and Oahu, a species on each island, and neither seems to be common. *A. gracilis* was found on the rocks in a mountain stream after a heavy spate, and probably lives beneath stones on the margins of these streams. *Pseudobroscus lentus* is only known from near the summit of Haleakala, Maui, where it was found under stones, a few weeks after the disappearance of the snow-cap.

The metallic and rather elegant, punctured, narrow species (four in number) of the genera *Derobroscus* and *Brosconymus* are only known from Oahu, where they are found in holes in the trunks or branches of trees, or beneath close fitting bark. In very wet forests we have once or twice found specimens on dark rainy nights, no doubt lying in wait for their prey, outside their burrows. I suspect that they may be common in the cavities in the higher branches and twigs of Koa trees, as the bird *Paroreomyza maculata* often contains fragments of many examples of these beetles, when it is shot while feeding amongst these branches. *Derobroscus politus* was wrongly recorded from 'leaves' of trees, I should have written 'twigs.'

Anchonymus agonoides was found very locally on Haleakala, inhabiting cavities in the trunk or branches of the Koa. When found, a considerable number of individuals is liable to occur, whereas of *Derobroscus* we never found more than two or three together. The larvae of both these genera were noticed in company with the adults. *Mauna frigida* is one of the most abundant species on Haleakala, Maui, and is found beneath stones in the open country above the forest from 5000—10,000 ft.

There are twelve described species of *Disenochus*, none, at present, being known from Hawaii or Oahu, but on the latter, doubtless, the genus is to be found. They occur beneath bark of trees, or rarely under logs lying on the ground, and several are only found in very wet moss, growing upon tree trunks. A good many of the species are rare or at least difficult to collect. *D. curtipes* in general form greatly resembles *Atrachycnemis*, to which genus I supposed it to belong. It also has the same habits. As a rule the species of *Disenochus* are remarkably constant in their exact habitats, the variable *D. aterrimus*, however, exhibits some inconstancy in its choice of these. *Chalcomenus* with three species occurs on most of the islands; the form on Hawaii seems to be practically the same as the Molokai species. It is remarkable for the fact that it roams about in the daytime, though usually this is only noticed in deep dark gulches. In more exposed and open situations many examples may be found hidden beneath stones or elsewhere, but none seen at large till after nightfall. The large beetles of the genus *Barypristus* are confined to the open country of the high mountains of Maui and Hawaii above the forest line, or on the edges of the region of large timber. Both species are found beneath stones, *B. rupicola* almost entirely so, but *B. incendiarius* on Hawaii, on the edge of the forest-belt, also occurs low down under bark of Koa trees, sometimes even beneath the level of the soil. Both are common beetles in suitable localities. *Baryneus sharpi*, differing from the preceding in its well-developed wings, is of far more arboreal habits and may be obtained high up in trees from beneath bark, usually of *Acacia koa*; but it is not restricted to that tree. Very rarely it is seen at large during the daytime, ovipositing in the chinks of the Koa trees. *Colpodiscus* contains two species, one of which is common to Maui and Hawaii, and is often extremely abundant, flying in numbers to light at night. On Hawaii it is usually found amongst dead leaves or fallen stems of tree-ferns, or beneath logs, but in the Iao valley it was found beneath stones or shingle on the banks of the stream, where *C. lahainensis* also occurs. Once we found a specimen devouring an *Oniscus*, a creature usually avoided by Carabidae, so that where it abounds under stones, ground-beetles are usually absent. *Prodisenochus terebratus* is found only on Haleakala, Maui, beneath or in decaying logs and appears to be rare. It is sometimes in company with *Atrachycnemis*, but is I think rarer than the latter. *Apteromesus maculatus* is restricted to Kauai, where it is common locally. *Mysticomenus* with two closely allied species is only known on Oahu. *M. mysticus* is said to occur beneath stones, but *M. tibialis* is common under bark in both mountain ranges.

The genus *Colpocaccus*, with six described species, contains some of the commonest Hawaiian Carabids, and most of the species are excessively closely allied, so that I suspect the number is liable to be reduced. They all are attracted by light at night in the forest region, to which they are restricted. They are remarkable for the inconstancy of their habits, not one of the forms being restricted to a special habitat. They may be found beneath stones, under or in logs, under bark of trees, in the stems of tree-ferns or amongst the dead fronds, in decaying vegetable matter on the ground, at the bases of leaves of *Freycinetia*, etc. and in other situations. Colonies even of hundreds of individuals are sometimes found together, and sometimes other rarer Carabidae are found mixed in these colonies. At night they may be seen at large on trees, or running about on the margins of mountain streams or on the ground beneath the forest trees. The fifteen species of *Atelothrus* are mostly found on the neighbouring intermediate islands of Maui, Molokai and Lanai, only one having been found on each of the islands Hawaii and Kauai, and that from the former island is of somewhat doubtful status (as to whether it is not a sport of *Mesothriscus* or *Metromenus*) and that from the latter is an aberrant form. Though none are recorded from Oahu, I have for some years known two remarkably distinct species from this island. Some of the species of *Atelothrus*, e.g. the very abundant *A. erro*, are not constant in their habits, since they are found both under stones, etc. on the ground and beneath bark of trees at a considerable height from the ground. Others like *A. platynoides* and *transiens*, I believe, have only arboreal habits. The fourteen species of *Mesothriscus* and twenty-six of *Metromenus* in general resemble *Atelothrus* in their habits, some being arboreal either living beneath bark or in moss or in cavities in rotten wood or in tree-ferns, or on the ground, in or beneath logs of wood, and but rarely under stones. A few species in both genera are found in wet forests by day on the flowers of *Astelia*, and some, like *Metromenus mutabilis*, hide in numbers at the bases of the leaves of this plant or (like *M. palmae*) of *Freycinetia*. Occasionally at night we have seen some of the Anchomenine Carabidae devouring caterpillars, and it is probable that these form a large part of their *pabulum*. Their fondness for *Acacia koa*, which so generally is attacked by caterpillars of *Scotorythra*, leads me to suspect that this genus supplies many of them with food. The beetles themselves are in some cases very long-lived, even under unnatural conditions in captivity, and I have been struck with the fact that while the larvae of many of them are found in the same situation as the adults, the latter generally are much more common. The species of *Mecostomus* and *Mecomenus* are not well known, but they are apparently terrestrial species.

That the Oahuan bird *Oreomyza maculata* apparently hunts specially for the Carabidae of the genus *Derobroscus* has been mentioned above, and I have found remains of *Colpocaccus hawaiiensis* in dissecting the rarer bird *Viridonia* on Hawaii, and this latter genus of beetles and some allied genera in other birds. *Metromenus*, *Colpocaccus* and other of the genera emit an unpleasant odour, and when a colony of *C. tantalus* is disturbed, under certain conditions of weather, the vapour given off becomes easily visible, and in ammonia gas produces dense white fumes.

Generally speaking one may say that of these Carabidae those species with the most diverse habits are the most abundant, but a few that are more constant in habits, e.g. *Metromenus palmae* and *M. mutabilis*, are also very common. It seems clear that the scarcity of some species is due to the fact, that they are very particular as to the condition of their habitat, and that these conditions can rarely be found. Such species cannot but be individually weak, even though they are generally present, when the right conditions occur. Others like *M. palmae* and *mutabilis* above mentioned, though restricted to certain environments, find the right conditions commonly. Yet other species, which apparently are rare, and yet, so far as one can judge, affect conditions that are commonly met with, may be thus rare because the conditions which are really suitable are not common, but we are not able to distinguish between the suitable and unsuitable.

The four genera of Pterostichini cannot at all be distinguished from one another by their habits, but there is much difference between some of the species in this respect. Generally speaking they agree in these with the Anchomenini. Many are arboreal being found only under bark, or moss, or in dead branches of growing trees, and usually those of terrestrial and arboreal habits are quite constant in these habits. Some of the ground-frequenting species are not uncommonly found in decayed stems of tree-ferns, and a few, like *Metrothorax deverilli*, are found beneath bark or moss on trees, in hollow decayed stems, and amongst decaying leaves upon the ground. Quite a few of the species occur beneath rocks or stones, chief amongst which is the extremely abundant *Mecyclothorax montivagus* of Maui, replaced on Hawaii by *M. pele*, of which some specimens seem intermediate in appearance. The Pterostichine beetles are almost ubiquitous throughout the forests of the islands, excepting where these are invaded by the introduced ant *Pheidole megacephala*, and those of Kauai, where not a single species has been discovered. On Oahu they are much more poorly represented than on the other islands with equal forest area. On the highest mountains a number of species are found in the open country above the forest-belt, but not one (nor any other endemic Carabid) is known below the forest, since every moderately damp situation is there occupied by the foreign ants. Probably all the species are nocturnal in their activities, since only on the rarest occasions has an individual been seen walking in the open or on the leaves of trees in the daytime. Apart from the question of the thoracic setae, some of the species are notably variable and varietal differences are sometimes considerable between individuals actually taken in company. A few species are remarkable for the peculiarities of their sculpture, as also are a good many of the Anchomenine series. Occasionally, as with the latter group, remains of Pterostichines have been observed in the native Drepanid birds.

The Bembidiini differ considerably from the other two groups of endemic Carabidae in the fact that no arboreal forms are known, though individuals have been met with on rare occasions in decayed parts of fern stems, and further, many of the species, that inhabit moderately damp situations, are found roaming about in full daylight. Occasionally we have noticed specimens feeding on minute larvae of other insects and once a number of individuals together were observed feeding on a dead hive-bee. The flightless *Gnatholymnaeum* was found in or beneath large stems of tree-ferns and is only known from Kauai, where the Bembidiine fauna is most richly developed. *Nesolymnaeum*, also containing only one species, has, I believe, similar habits, but is fully winged. It is widely distributed occurring from Oahu to Maui, though rare. *Bembidium teres* is already known on all the islands from Kauai to Maui and is sometimes numerous amongst the small stones or shingle on the edge of mountain streams. *B. pacificum* is more often found amongst dead leaves and is fairly common locally on Oahu and occurs on Kauai. *B. molokaiense* another winged species is found from Kauai to Maui. *Nesocidium* as a genus is only distinguished from some of the species of *Bembidium* (*B. molokaiense*) by its vestigial wings. *N. laeticulum* is found from Kauai to Maui or with the same range as *B. molokaiense*, suggesting the idea that it is a dimorphic form of this, as does its structure. The other species of *Nesocidium* are at present known each from only one island, but they have mostly been so rarely collected, that not very much weight can be attached to this. The genera *Atelidium*, *Metrocidium*, *Nesomicrops* and *Macranillus*, each monotypic and endemic, are only known from Kauai. Their habits are the same as those of *Nesocidium*.

Excepting that two species of Hawaiian Carabidae are referred to the widespread genus *Platynus* and five to the ubiquitous *Bembidium*, all the certainly endemic species are placed in genera that are also endemic.

Review of Lepidoptera.

Up to the present time[1] 764 species of this Order have been described or enumerated from the main islands, but of these at least 61 may be considered as foreign. Many of the latter are obviously importations by man, while a minority are equally certainly natural immigrants from other countries; a few cannot with certainty be assigned to either of these classes, but almost certainly belong to one or the other. Seven hundred species, or 92 per cent. of the Lepidopterous fauna, are therefore endemic.

Of all the families of the Order twenty only are represented in the islands, and three of these contain each only one species and that certainly imported by man. The Pierid, *Pieris rapae* was imported with cabbages from California some 12 years ago; *Meliphora grisella* (Galleriadae), no doubt, with honey bees; *Ethmia colonella* (Oecophoridae), appeared in the islands a good many years ago, but is known to have been of comparatively modern introduction. Other two families, Nymphalidae and Lycaenidae, are represented by only one endemic species each, supposing *Lycaena blackburni* to be truly endemic, which is by no means certain.

If we leave the foreign element in the different families out of consideration, we find that nine only contain fifteen or more species. These are the Caradrinidae with 34 species, Hydriomenidae 17, Selidosemidae 39, Pyraustidae 172, Gelechiidae 41, Hypomoneutidae 270, Carposinidae 33, Tortricidae 47, Tineidae 15. Consequently nine families contain no less than 668 of the endemic species or 95 per cent. of the whole.

The 764 species of Lepidoptera are distributed in 117 genera, of which 37 are supposed to be endemic. Generic endemicity is much greater in the smaller moths (i.e. in the Tortricina and Tineina together) than in the aggregate of other great groups or superfamilies, in fact it is nearly twice as great in the former, which have 24 of the 58 genera endemic. The larger moths and butterflies on the other hand have only 13 endemic genera of their total of 59. Thirty-three genera contain only apodemic species, these being either introductions by man or in some cases natural immigrants, while thirty-three genera, though themselves apodemic, contain only endemic species. Fourteen genera contain a mixture of endemic and apodemic species. The 61 foreign species are therefore distributed in 47 genera, or average about 1·3 to a genus, while the 702 endemic species are placed in 84 genera, an average of 8·3 to each genus.

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[1] In this account the families and genera adopted are as in the Systematic part of this work. In a few cases the number of species is slightly changed to bring this up to date—June 1909.

Many of the endemic genera, that contain a single, or only a few species, are clearly offshoots from other of the larger endemic genera, or as one might say, they are species of these genera, which have diverged more widely in structure than the average. Such are *Sisyrophyta*, *Nesochlide*, and *Acrodrepanis*, derivatives of, or at least of the same original ancestors as, *Scotorythra*, the formation of such genera having no doubt taken place within the islands. Similar groups are *Mestolobes*, *Promylaea*, *Orthomecyna* and *Protaulacistis*; *Thyrcopa*, *Catamempsis*, *Psychra*, *Ptycothrix* and *Hodegia*, and others.

While therefore the apodemic genera are usually very distinct or remote from one another, the endemic are often closely allied to one another, in such a way as to form aggregates of several allied genera, these aggregates being generally remote from one another and more nearly corresponding to the apodemic genera than do the individual genera composing them.

These preliminary remarks will show the restricted nature of the indigenous Lepidopterous fauna, and from how few original ancestral immigrants it might have been derived.

Caradrinidae.—There are five genera, three, *Heliothis*, *Caradrina* and *Spodoptera*, containing only foreign species, and two, *Agrotis* and *Leucania*, with both endemic and apodemic species. The two very widely distributed *Agrotis*, *A. ypsilon* and *A. saucia*, though they may have reached the islands by natural means, are equally likely to have been imported in their earlier stages by man. This is also true of *Leucania unipuncta*. This latter and *A. ypsilon* both occurred to Blackburn during his residence in the islands, but *A. saucia* is apparently a more recent introduction. In the winter months it is often common in gardens in Honolulu, as well as being abundant in mountain localities at other seasons, yet it would appear not to have reached the islands up to the time of Blackburn's departure.

Apart from all these foreign members, *Agrotis* has 26 and *Leucania* 8 endemic species. Meyrick considers these endemic *Agrotis* as probably of American origin and forming a group of allied species, but Hampson scatters them in five genera (*Feltia*, *Epipsilia*, *Agrotis*, *Agrotiphila* and *Euxoa*) these being themselves all of wide distribution. Similarly the eight endemic *Leucania* are referred by Hampson to three genera, *Cirphis*, *Eriopygodes* and *Hyssia*. Meyrick recognizes two "quite independent and dissimilar groups," the first four species forming an endemic group of unknown origin, while the others are allied to *L. unipuncta*. It is the first of these two groups that contains the species referred to *Eriopygodes* and *Hyssia* by Hampson.

Heliothis armigera is no doubt a natural immigrant, as also are the two species of *Spodoptera*, while *Caradrina reclusa* is a recent importation (first appearing in 1902 but now fully established) and the other *Caradrina* (*C. examinis*) will also probably prove to be foreign.

Leucania euclidias is one of the most variable of Hawaiian moths; some of these varieties are figured in Volume I. pl. 3. The most extreme varieties are found at the same time and place, but it would appear that in some localities the species exhibits a much smaller proportion of extreme aberrations than in others. It is extremely abundant in the wet woods of the Hilo and Puna district, where *L. niphadopa*, *compsias* and *anthracias* are found with it, but in much smaller numbers. There the caterpillars are common on ferns, and the pupae in decayed wood or beneath moss. All of these species are attracted by light and in some localities *L. euclidias* appears at all hours, but on the lower edge of the forest at Waialua on Oahu, we observed on several occasions, that no more than a straggler or two were ever attracted until 11.30 p.m. or later, when scores would arrive in quick succession, till hundreds in all were present. No matter how favourable the earlier hours had been for the capture of other moths, *L. euclidias* never put in an appearance in numbers until near midnight, and striking varieties were in small proportion to the more usual forms, certainly far less numerous than in some of the wetter districts. All the species of this group are true forest insects and most abundant in wet forests. During the daytime the moths hide amongst dead leaves and are sometimes very numerous in the masses of dead fronds that remain attached to tree-ferns.

The remaining group of *Leucania* contains species very similar to the widely spread *L. unipuncta* which are less special in their habitats. *L. amblycasis*, even in dry localities, is not infrequently found on the lowlands in company with *L. unipuncta*. In the forest region it is much attracted by the flowers of *Metrosiderus*, of which a small tree may yield hundreds of examples of this moth. When disturbed they fall to the ground and make no attempt to fly, being gorged with the copious nectar of the flowers. The moth has great powers of flight and we have known it attracted to the lights of an interisland steamer, when this was in midchannel. This and *L. pyrrhias* in the larval state feed on grasses, attacking imported species and sugar cane, but the natural food of the latter species is more probably the common sedge *Baumea meyenii*, in the debris at the roots of which Swezey has found it hiding. The caterpillars of this *unipuncta* group of *Leucania* are very different from those of the *euclidias* group.

The endemic species of *Agrotis* are of diversified habits, some being true forest insects, while others are to be found rather in the open country, whether this be at low or high elevations in the mountains. *A. microreas* flies freely in the morning sunshine over the low growth of *Vaccinium*, *Cyathodes* etc., which covers the ground in open, upland forest-land of Hawaii. At certain seasons we have observed it on the wing in great numbers, reminding us very strongly by its flight and appearance of the well-known European *Charaeas graminis.*

Some species are littoral or sublittoral and attached chiefly to dry sandy localities. *Agrotis cremata* and *photophila* are notable examples. Others, such as *A. arenivolans* and *dislocata* frequent the coastal districts, lowlands and lower mountain elevations and then reappear above the forest-line or in extensive open places in the forest. *A. dislocata* is one of the commonest species, and its caterpillar sometimes does much damage to farm produce, stripping the potato, tomato and many other plants of their foliage, as well as gnawing through the stems. In this work it is frequently aided by the caterpillar of the very dissimilar moth *A. crinigera*, both being truly 'cut-worms' and in the larval state remarkably similar to one another. Sometimes one and sometimes the other is the most injurious, but *dislocata* appears to thrive at higher altitudes in the mountains. On the uplands of Hawaii, as at Waimea, where *A. dislocata* sometimes does much injury to cultivated plants, the moths are noticeably different from those taken on Oahu, Molokai, etc. They are greyer or whiter in appearance and this gives them a distinctive look, when series of examples are placed side by side. These two injurious species are a favourite food of the golden plover, which catches the moths, as well as their caterpillars.

On the high mountains above the forest-line and in open forest *A. crinigera* seems to be replaced by allied forms, *A. mesotoxa*, *epicremna* and *baliopa*, which never descend to the open country below the forest. Similarly, at great elevations, *A. dislocata* is replaced by *A. aulacias* on Maui and on Hawaii by an undescribed species.

At present little is known as to the parasites of *Agrotis* and *Leucania*, except that some of the species are much destroyed by the Tachinid *Chaetogaedia monticola* and to a lesser extent by *Frontina archippivora*.

A species of *Enicospilus* has been bred from *A. dislocata*, and it is therefore likely that the Ophioninae will be found to attack many of these caterpillars, as they are partial to the endemic *Leucaniae*.

All the endemic *Agrotis* have great powers of flight, and many of them rise so readily in the daytime, as one walks along, and travel at such speed with the wind, that even where individuals are very numerous, it is often difficult to capture many specimens. This is especially the case with those that frequent the open and exposed parts of the higher mountains, where strong winds are prevalent. Many of the species are very strongly attracted by the juices exuding from decaying fern leaves, and also by artificial light, while some visit the flowers of *Metrosiderus* and sandal trees, and no doubt others.

Heliothis armiger, though a common insect, does not appear ever to attain here the extraordinary abundance that it reaches in other countries. The larvae, often lying exposed in the flowers of *Sida*, or on other plants, are very subject to the attacks of the two Tachinid flies mentioned above, as being parasites of *Agrotis*, and in some seasons nearly all the specimens found are parasitized. The colour variations of the moth are numerous, and are not of local occurrence. Thus eight examples taken together on Molokai varied from the palest yellow form to the darkest suffused one, not two individuals being alike. On the dry lowlands *H. armiger* is rare, except during the winter months, or when *Sida* and other lowland plants spring up afresh after heavy rains.

The two species of *Spodoptera* are doubtless natural immigrants, *S. exigua* being practically cosmopolitan in warm regions, while *S. mauritia* is one of the few insects that have always been well known to the natives, on account of the periodical abundance of its larvae. These are truly 'army-worms' marching over great areas of pasture land and devouring all the herbage on their march. Of late years these great armies have been much less frequently noticed, though formerly of annual occurrence at the season of the growth of fresh grass. There is no doubt that this diminution of the ravages of the grass army-worm was due to the excessive multiplication of the imported Indian mynah bird (*Acridotheres tristis*), great flocks of which visited the pasture lands to feed on the caterpillars. Of late years it would appear that the mynah bird has become less numerous, owing to the failure of lantana berries, which formed its chief supply of food throughout the year, and it is said that, coincidently with this decrease, the army-worm has again occasionally become conspicuous in some pastures. Previous to the great multiplication of the mynah bird, this *Spodoptera* was a favourite and important food-supply of the golden plover during the winter months. It is well known that, when feeding on the hordes of caterpillars, these migrants from Alaska arrived at their finest condition, before leaving the islands for their distant breeding grounds.

Of the two species of *Caradrina*, *C. reclusa* is a recent importation, no doubt from Fiji, as we have seen its larvae on consignments of plants from those islands. It was first found in Honolulu in 1903 and soon became common, and extended its range to other of the islands. *C. examinis*, once found on the island of Hawaii, is probably also a foreign species.

Plusiadae.—The two genera *Simplicia* and *Adrapsa* are each represented by an introduced species, both of them occurring in Fiji, and we have found the larvae of both swarming on plants imported from that group. The *Simplicia* was imported long before the *Adrapsa*, which was not noticed until after 1902.

Nesamiptis, with two species, was described from the islands, but I believe exists in tropical Australia. One of the species (*N. obsoleta*) is extremely common and most variable in colour and pattern of markings. Its caterpillars feed very freely on the imported 'Hilo' grass. The other, *N. plagiota*, is much more local, though sometimes common, and appears to vary very little as compared with its congener. *Hypenodes*, with seven species, has one which is very widely distributed and abundant, and also very variable (*H. altivolans*). It is freely attracted by light and to sugared trees and may often be observed in great numbers flying at dusk in marshy places in the mountains amongst sedges. Most of the other species frequent very wet forests, and are much less numerous and less commonplace in appearance.

Of the two species of *Cosmophila* one is probably introduced, as we have found its caterpillars on plants brought from Fiji. Both exhibit much variation, but in the case of the foreign *C. sabulifera*, variation is local or irregular. In one instance a number of caterpillars, taken on a native *Hibiscus* (?) in a mountain forest, produced a very variable series of adults, including some remarkable aberrations. On another occasion a very large number of moths bred from caterpillars, that were injuring a fine hedge of a foreign *Hibiscus*, showed no remarkable varieties. Sometimes the foliage of the 'Hau' tree (*H. tiliaceus*) is much injured by these caterpillars. *C. noctivolans* is sometimes found commonly in dry places amongst *Sida*, on which the larvae feed, as well as on some of the plants affected by *C. sabulifera*. The latter is much parasitized by the common Tachinid flies, *Chaetogaedia* and *Frontina*, so that hedges of *Hibiscus*, very badly defoliated, may become entirely freed from caterpillars by their means.

Of the two species of *Hypocala*, *H. andremona* is, doubtless, a natural immigrant, these insects being endowed with great powers of flight. *H. velans*, considered by Meyrick as a variety of *andremona*, is, I think, clearly a distinct species and presumably derived from the latter. It appears to be much more numerous than *andremona* in most parts of the islands. In the daytime it often secretes itself amongst the lava, which is piled up to form walls in various parts of Hawaii, and from these it is very easily disturbed in the daytime. It also frequents the caves and cavities in the sides of precipitous gulches, issuing from these in great numbers, as we have noticed on Molokai and elsewhere. It freely enters houses, much more often than *H. andremona*. Both feed on *Maba sandwichensis*, and their earlier stages have been studied by Swezey, confirming their distinctness. Although most abundant on the lowlands and lower mountain slopes, we have noted the occurrence of *H. velans* in a well-known cave at an altitude of nearly 9000 ft. on Haleakala.

Plusia chalcites and *P. biloba* are, no doubt, natural immigrants, the former ubiquitous and very numerous, often indeed injurious, being polyphagous, the latter most partial to the uplands and generally scarce. *P. chalcites* occurs also on Midway Island. In the wettest districts of the islands the caterpillars are sometimes destroyed wholesale by epidemics of a fungous disease, while another fungus attacks the moth. The pupae are much parasitized by the endemic *Echthromorpha* and the imported *Chalcis obscurata*, and the caterpillars by the Tachinid flies. But for these restraining agents, *P. chalcites* would prove one of the worst of pests. *P. pterylotis* is a very remarkable endemic species of rare occurrence, but widely distributed, as it has been found on Oahu and Hawaii. It is replaced on Maui by an allied, but very distinct species. These endemic forms have no connection with the apodemic ones named above, nor are they apparently closely related to any known species of the genus. The cause of their rarity is not known, but, no doubt, they will be found to be heavily parasitized by the *Echthromorpha*, which is always very numerous in the localities where they occur.

Hydriomenidae.—The greater number of the species belong to the genus *Eucymatoge*, with 10 described forms and, doubtless, others to be discovered. *E. monticolans* is ubiquitous throughout the forests, and is remarkable for its great variability. Extreme varieties are often found in company, but in some localities (notably, e.g., on the summit of the small island of Lanai) there is a tendency for some particular variety to predominate or become conspicuous. Some of the variations have been figured in the systematic portion of this work. The Hawaiian species, like others, rest during the daytime with outspread wings on the trunks of forest trees. *E. monticolans* on various trees and *E. craterias* on *Acacia koa* are very often obtained by examining the trunks. The latter also rests on the surface of rocks. One or two species are found above the elevation of the true forest-belt, and some are restricted to very wet woods. *E. monticolans* has been bred from a full-grown larva found on *Metrosiderus polymorpha.* The species of *Xanthorhoe* appear to be all rare insects in the imaginal state, and their earlier stages are not known. *X. insularis* is found above the forest-belt on Haleakala, Maui, from seven or eight thousand feet above sea-level upwards. The other three species are forest insects. *Progonostola cremnopis*, forming an endemic genus, is widely distributed, and occurs on Oahu, as well as on the windward islands. Near Honolulu it may be found resting on tree-trunks or the stems of tree-ferns on Mt. Tantalus, and on the decomposed lava of steep cliffs at Nuuanu Pali. It bears a considerable superficial resemblance to *Xanthorhoe caustoscia.* The single species of *Dasyuris* was found on the upper skirts of the forest on Haleakala, Maui, where it occurs periodically in extraordinary numbers, flying by day. On several visits to the locality not a single example has been observed, but on one occasion it was swarming over a limited area. Though not a rapid flier, it was not very easily captured, being expert at keeping just out of reach. The smaller *Hydriomena aphoristis* appears to have similar habits, being also a day-flier, though also attracted by light at night, but is usually seen singly, and we have never seen it in numbers. It has so far only occurred on Hawaii.

SELIDOSEMIDAE.—The Selidosemidae with about forty known species, and, doubtless, others undiscovered, are a most important element of the Lepidopterous fauna. Most of these are absorbed in the genus *Scotorythra* with 34 species, and the other four genera may be looked on, for the most part, as merely more modified forms of the large genus. All five genera are endemic. The forms included in *Scotorythra* itself are of varied structure, as if tending to break up into several groups or genera, and these distinctions in the adults appear to be to some extent correlated with corresponding differences in larval characters. The smaller species of the genus, belonging to the group of *S. corticea*, for instance, have a characteristic appearance and pattern (or form of the second line of the forewings), tending at the same time to differ in character of neuration, and also in the length of the tibial spurs from the others. Some of them, and perhaps all, rest at times with spread wings, Boarmia-like, on the trunks of trees. On the other hand the numerous species, large and small, of the *S. rara* group, rest, Anisopteryx-like, with the wings unspread, so as to form an elongate triangle, creeping into holes in trees or beneath bark, or lying hidden amongst masses of dead fern leaves during the daytime. *Sisyrophyta* is remarkable for the secondary sexual characters of the male, the wings being more or less distorted in this sex by a special clothing of the under-surface, which in *S. gomphias* has the appearance of a dense felt. *Nesochlide* has a group of specially modified scales on the underside of the forewings in the male. The great *Acrodrepanis* and small *Tritocleis* lack the modified hind tibiae and the characteristic hair-pencils of the other forms.

Some of the species of *Scotorythra* are amongst the commonest of moths, and some have been able to adapt themselves to great changes in their environment. Thus *Scotorythra rara* and *brachytarsa* sometimes become very numerous, their caterpillars feeding on the introduced guava trees, in localities whence all native vegetation has disappeared. We have even found caterpillars of this genus feeding on the strong-scented imported Lantana. *Sisyrophyta gomphias* can also maintain itself away from native vegetation.

Many of the species of *Scotorythra* are polyphagous, but even these seem specially to favour certain plants. *Acacia koa* is attacked by numerous species, and certain of these become locally and periodically so numerous, that great areas of 'Koa' forest are entirely denuded of their phyllodes. When this denudation is long continued we have known trees to be entirely killed, not perhaps altogether directly owing to the attacks of the *Scotorythra,* but because, after a sickly condition had been induced by the denudation of foliage, other insects (e.g. the longicorn beetles of the genus *Plogithmysus* and the small, boring Scolytidae) joined in the attack. *Scotorythra idolias* on Hawaii and *S. paludicola* on Maui were responsible for two of the most severe attacks that we have witnessed. Native birds attracted in thousands by the abundance of this, one of their favourite foods, were gorged to repletion, and the starving caterpillars formed writhing masses on the ground beneath the tall Koa trees. The dropping of excrement from the trees on the dead leaves beneath made a rattling noise as of a hailstorm. In one instance it was noted that these pests of caterpillars were destroyed by an epidemic fungous disease, which attacked the full-grown larvae after their descent to the ground for pupation, as well as the pupae themselves.

In open spaces in the forests at nightfall one may see large numbers of the moths flying slowly overhead and often out of reach, traversing these spaces and all or nearly all travelling in the same direction. Sometimes they congregate in hundreds within some hollow tree-trunk or amongst the pendent masses of dead fronds of tree-ferns. In some cases all the individuals so congregating are males, even in one case where several hundreds of examples were taken together. Many of the species are attracted by light, in some of these the males and in others the females are much more numerous. Thus but one female of *Nesochlide epixantha* was attracted amongst scores of the other sex. The males of this pretty species also freely visit the flowers of *Metrosiderus*, and they are abroad on the most windy nights, to which, no doubt, is due the fact that one occasionally meets with a straggler on the lowlands, and even in the town of Honolulu. The female of this species is remarkable in that it is occasionally found flying freely in the sunshine.

No doubt, formerly, numerous species have existed on the lowlands, but these have mostly disappeared owing to the attacks of foreign predaceous insects, especially ants. In very dry localities, where that destructive little ant *Pheidole megacephala* is unable to exist, or is hardly present, species of *Scotorythra* still flourish. This is the case with *S. paratactis*, the caterpillars of which are very numerous on the scanty vegetation that grows near the coast on the driest parts of the west side of Oahu. The exposed caterpillars of this species would be quickly exterminated by *Pheidole* in most parts of the coastal region of this island.

The caterpillars of some of the species of *Scotorythra* appear to be nocturnal in their feeding habits, and during the daytime hide beneath the bark of the trunks of the trees, on whose foliage they feed. In this situation considerable numbers may be found at rest, ranged side by side. They form a most important part of the food supply of the endemic birds, and are supplied by the parents to the young of nearly all the species, while they are a favourite food of many adult birds as well. On the other hand they are very little attacked by the many species of wasps of the genus *Odynerus*, and it is most remarkable that, since these do occasionally store them up in their cells as food for their young, they should not more often avail themselves of so abundant a prey, when more favourite caterpillars become scarce or fail. The ubiquitous bug, *Oechalia grisea*, also destroys great numbers of the larvae of many *Scotorythra*. The variation in colour and markings of many of the species of *Scotorythra* (as well as of *Nesochlide* and *Acrodrepanis*) is very great, and some idea of this variability may be gathered from the figures accompanying the systematic descriptions in this work. In most species, that show much variation, the extreme varieties are taken in company. It is not known whether difference in the food plant is to any extent the cause of variation, but it is certain that it is not so in some cases, where variation is very great, as several species have been tested in this respect. It is very noticeable how frequently species, that are quite distinct, yield similar varieties, and a character which appears as a variation in one or more species may be a constant character in another. As an example of this one may mention the presence, as a constant character, or merely as an infrequent variation, of a conspicuous pale costal streak. In some species the males and in others the females appear to be more subject to variation, and some, of which large numbers have been examined, exhibit very little variability.

The pupae of *Scotorythra* are very commonly found when one is searching for other insects, under wet moss, in damp rotten wood, under logs, and in other situations. Most of them, however, as well as the caterpillars, are difficult to breed, when removed from the wet mountain forests to the lowlands, even though great pains are taken to keep them as nearly as possible under natural conditions. Some of the large species have been observed laying their eggs in the bark of trees, the ovipositor being of great length when fully protruded.

SPHINGIDAE.—Only six species of this family are at present known, and of these three are known elsewhere, being natural immigrants. The widely distributed *Sphinx convolvuli* is more abundant than its congener, *Sphinx celeus*. The latter is usually found in the larval state, feeding on the tobacco plant, or on some of the species of *Solanum*, while the former is not only extremely common on many species of *Ipomoea*, as well as on other plants, as a caterpillar, but is also an abundant moth, readily attracted by flowers or electric lights. In the morning large numbers may sometimes be found attached to the flowers of the wild ginger, which they have visited during the night, and from which they have been unable to withdraw their proboscis. Examples so caught are often devoured by ants during the course of the day. The caterpillars of *S. convolvuli* are very variable in colour, and all sorts of varieties of these may be found at the same time and place. Sometimes they do considerable injury to the sweet potato (*Ipomoea batatas*). The eggs are subject to the attacks of the small parasite *Pentarthron*. The third immigrant, *Deilephila lineata*, is also a most abundant species, and ranges to much greater elevations than the species of *Sphinx*, for we have found the caterpillars entirely stripping certain plants at a height of 5000 ft. in the mountains, and at still greater altitudes. In dry districts near the coast it appears in abundance periodically, after or during the rains, and is polyphagous. The moth may be seen on the wing sucking the blossoms of lantana or other tubular flowers, even during the hottest sunshine, though usually more active towards night.

Three closely allied endemic species of *Deilephila* are of more interest. They are chiefly forest insects, though they range over the dry forehills down to the coast. *D. wilsoni* (*pyrias*) is at present known only from Hawaii, where it is generally distributed, the polyphagous caterpillars feeding on many forest trees of different families. In wet districts the moth is freely on the wing at all hours of the day, visiting the flowers of *Metrosiderus*, as well as those of cultivated plants, nasturtiums, canna, etc. In drier localities it flies more freely at dusk. We have seen hundreds together rising straight up from the rough lava flows, that intersect the dense forests of the Hilo district of Hawaii, till they reached the height of the tall tree-tops on either side of the flow. *D. calida* is generally distributed on Oahu and Molokai and its caterpillar is polyphagous like that of *wilsoni*. It varies much in markings, sometimes having a pair or a number of eye-spots present, and these eye-spots may differ in number on either side of the body, and in different individuals may occupy entirely different segments. In many examples they are altogether wanting. Sometimes they are present only towards the head end of the caterpillar, sometimes only on the segments near the caudal extremity. The moth itself exhibits a good deal of variability, as does *D. wilsoni*. On Hawaii in addition to the latter there exists a second species or local race, much more nearly allied to *D. calida*. No representative of these has yet been taken on Kauai, but caterpillars similar to those of the others have frequently been found there, so that at least one additional species is to be expected, unless these caterpillars prove to belong to the remarkable green-coloured *D. smaragditis*. Probably other species allied to *D. calida* remain to be discovered. We have found many larvae of the last named marked with black scars, showing the attack of some parasitic or predaceous insect, but nothing was bred from these.

PIERIDAE.—*Pieris rapae* first appeared in 1897, having been, doubtless, introduced with cabbages from California. On the lowlands it abounds chiefly during the winter months and becomes to a considerable extent injurious. All the butterflies produced are of the European summer form, there being no seasonal dimorphism. In dry hot coastal districts the eggs are laid very freely on *Capparis sandwichiana* of the Capparidaceae, so that the butterfly is often very abundant in localities, where, at first sight, no suitable food-plant appears to be present. The eggs of *Pieris* are in some places much destroyed by the little ant *Pheidole megacephala*, and the caterpillars are preyed on by introduced wasps of the genus *Polistes*, which strip and carry off portions of them to feed their young. It would appear that as *Polistes* increases in numbers in the summer, after new colonies have been started by the hibernated females, the *Pieris* becomes much less numerous, while as soon as the nests of the wasps are deserted and the state of hibernation is begun, the butterflies increase very rapidly and their caterpillars become very troublesome. The well-known parasite *Pteromalus puparum*, which has several times been imported in great numbers, as an enemy of the *Pieris*, is apparently unable to establish itself here.

NYMPHALIDAE.—*Anosia erippus* is no doubt a natural immigrant, which has established itself in the islands since the introduction of the milk weed, on which it feeds, by foreigners. It is found wherever the food-plant grows, and, being a very powerful flier, often in places far distant from this plant. Though very common, it is not, as has been reported by a visiting entomologist, the commonest butterfly in the islands, being much less numerous, for instance, than *Lycaena boetica*. It is not very variable, though once or twice we have noted melanochroic and albinoic examples on the wing amongst the large numbers seen. The caterpillars are attacked by the common Tachinid fly, *Frontina archippivora*.

Vanessa cardui and *huntera* are both natural immigrants, the former feeding mostly on malvaceous plants and introduced thistles, but also on *Gnaphalium*, on which the latter habitually feeds. In dry districts on the lowlands both these species become abundant on the appearance of a fresh growth of vegetation following copious rain, but disappear with the drying up of low plants. *V. cardui* sometimes entirely strips the common weeds on which it feeds, so that we have even seen the caterpillars perishing of starvation. It is sometimes much parasitized by the Tachinid, *Frontina*. A considerable percentage of the Hawaiian *cardui* are intermediate between the var. *kershawi*, which has been considered by some a distinct species, and typical *cardui*, while some are typical *kershawi*. Eggs laid by the same female may produce both forms and intermediates.

V. atalanta has only been found on the island of Hawaii, where it is sometimes abundant in the mountain forests. It was not noticed by Mr Blackburn during the period of his collecting, and is probably a recent arrival. It is quite doubtful whether it is a natural immigrant at all, and we suspect it may have been introduced by man. It is at least remarkable that in the past 18 years it should not have spread to the other islands. We have found it very numerously in Olaa, Hawaii, flying freely even in the heavy rains of that rainy district, and visiting the flowers of *Rubus*. Sometimes also it was attracted at night to the lights in the house. It is abundant too in the Kona district.

V. tammeamea is by far the most interesting of the few Hawaiian butterflies, being found throughout the forests of all the islands, and at times it is even seen in gardens in Honolulu. Such visits, however, are accidental, and usually occur during or after stormy weather in the winter months. The butterfly itself is remarkable for the great variation of the under side of the wings, whereas the coloration of the upper side varies but little. The sexes are easily distinguished by the difference in colour of some of the small spots in the black apical part of the front wings, these spots being pure white in the female. The flowers of *Broussaisia* are often very attractive to this butterfly, as are those of an introduced *Rubus*, but more often it is found feeding on the exuding sap of *Acacia koa*, *Myoporum*, and other common forest trees. Having a very powerful flight it is sometimes met with far from its usual haunts, as for instance on the tops of the highest mountains or near the sea-coast. The caterpillars are very variable, being sometimes green or purplish or particoloured. When young they fold back a small part of the leaf and thus conceal themselves, but when larger often feed exposed. Their food consists of various urticaceous plants, especially *Pipturus albidus*, but *Urena* and other genera are also attacked. On one occasion a female butterfly was observed near the coast at Honolulu ovipositing on young plants of the common malvaceous weed, on which *V. cardui* is so abundant. By following this female as it flew from plant to plant, a number of eggs were collected, as they were laid. The caterpillars however, when they hatched out, refused to eat the young growing plants on which they were placed, and, after crawling about these for a day or more, died of hunger. Others from the same lot of eggs, being given leaves of the native 'mamake' (*Pipturus*), survived. It would therefore appear that the butterfly, when driven from the mountains to the lowlands, where the usual Urticaceae are absent, will select as a food-plant for its caterpillars or rather for ovipositing, one which is freely fed on by allied species of its genus (e.g. *V. cardui*), although its own caterpillar is not able to subsist on this. Possibly the instinct of selecting this malvaceous plant is an ancestral one, still retained, though now fatal to the progeny.

The chrysalis of *V. tammeamea* is occasionally found suspended from the leaves of various trees or plants in the forest, but we have more often found parasitized examples than sound ones. From the former one breeds the Pimpline Ichneumon, *Echthromorpha maculipennis*, and of late years, occasionally, the imported Chalcid, *Chalcis obscurata*. In spite of these enemies, and, sometimes, of Tachinid flies, the Kamehameha butterfly is a common insect, and at the same time the finest and most conspicuous in the Hawaiian fauna. As many as a dozen or two may at times be seen flying around some injured Koa tree, from which sap is exuding, or resting on its trunk or branches. On such occasions it is sometimes possible to place a net over some half-dozen individuals at once. Only a small proportion of examples caught in the field are in perfect condition, the wings, though strong, being apparently very brittle. Although the butterfly bears a general resemblance to other species of *Pyrameis*, the caterpillar is so very distinct, that it would be taken to belong to some other genus. The very numerous stout spines with which the head is set, the absence of any mediodorsal line of spines, and the enormous development of two apical abdominal ones, give it an extraordinary appearance.

LYCAENIDAE.—*L. boetica* is ubiquitous throughout the group, feeding on many leguminous plants in the open country, and we have found it at an elevation of some 7000 ft. in the mountains frequenting the flowers of *Sophora chrysophylla*. It is apparently free from the attacks of parasites, but both larvae and eggs are destroyed by the ant *Pheidole megacephala*. The date of its importation is not known, but it has been present for more than thirty years.

L. blackburni is not at present known outside the islands, though it will quite possibly be found elsewhere. Though chiefly found in the mountains, it is also frequently common on the lowlands, sometimes occurring commonly in gardens in Honolulu. In the latter, the caterpillar[1] feeds on various foreign trees that bear pods; in the mountains it infests the pods of *Acacia koa* and the leaves and capsules of *Dodonaea viscosa*. This species is not known to be attacked by any parasites, nor does it exhibit any striking variation.

During recent years other two Lycaenidae have been imported, as destroyers of the flowers and seeds of *Lantana camara*. They are natives of Mexico, where they are so greatly attacked by parasites, that fully 90 per cent. of the larvae were destroyed by these in their native country, and the butterflies rarely seen. In the islands they become excessively numerous, whenever the Lantana flowers freely enough to admit of their multiplication. They are apparently exempt from parasites, though the eggs are often much destroyed by *Pheidole*.

PHYCITIDAE.—The few Hawaiian representatives of this family are small, obscure species, all but three or four being introductions imported with articles of food.

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[1] Mr J. C. Kershaw informs me that this caterpillar is devoid of the usual glands found on the abdominal segments of Lycaenid caterpillars. If the butterfly is really endemic, this fact in connection with the absence of any native ants, except the entirely terrestrial *Ponera perkinsi*, is interesting, since the excretion of these glands is habitually eaten by ants.

Genophantis, however, is an endemic genus (liable to prove apodemic on further research in other countries) and the species of *Homoeosoma* are also endemic. All these insects are attracted freely by light and all the species are common in their proper haunts. *Genophantis* is attached to Euphorbiaceous, *Homoeosoma* to Composite plants. The larvae are sometimes found stored up in the cells of *Odynerus*, and they are parasitized by the Ophionines of the genus *Limnerium* and *Lathrostizus* and sometimes by *Chelonus blackburni*.

The most interesting species of this family is one whose caterpillar is excessively abundant in the flowering stem of *Argyroxiphium*, the silver sword plant, a composite found plentifully near the summit and in the crater of Haleakala. Probably this insect will form a new genus, the species being as yet undescribed. Of many hundreds of caterpillars brought down from the crater to Honolulu in 1896 only one or two produced moths.

GALLERIADAE.—The single representative, *Meliphora grisella*, is of course an importation with honey-bees, and of no special interest.

CRAMBIDAE.—There are half-a-dozen endemic species of *Talis*, small obscure grass-moths, some of which exhibit a good deal of variability in markings and colour. They are able to flourish in the driest localities near the coast, and also frequent open parts of the forest region in the high mountains. Most and probably all the species are under favourable circumstances very numerous in individuals. They are easily disturbed in the daytime and are attracted very readily to light at night. The larvae of one or more species have been found at the roots of tufts of grasses. Of the habits of the single *Prionopteryx* nothing is known and its claim to be endemic is quite uncertain.

The *Euchromius* is a foreign species, now fully established on several of the islands, frequenting the lowlands and lower mountain slopes, below the line of forest. We have seen it flying in numbers in the daytime amongst grass and *Sida rhombifolia* on Molokai at elevations below 1000 ft. during the cooler months of the year.

PYRAUSTIDAE. This is by far the most extensively represented family of the larger Lepidoptera. Eighteen genera are at present known, but of these four—*Nymphula*, *Evergestis*, *Nomophila* and *Hellula*—contain each a single foreign species only. On the other hand five genera—*Hyperectis*, *Promylaea*, *Mestolobes*, *Orthomecyna* and *Protaulacistis* are endemic. *Hymenia* is represented by one apodemic and widely distributed, and one endemic species. The remaining eight genera, though apodemic, contain only endemic species. *Hellula undalis*, the caterpillar of which is the well-known 'Cabbage web-worm' of America, has of course been introduced by man, and *Evergestis anastomosalis* is a still more recent introduction from the oriental region. It is injurious to the sweet potato, in the stems and tubers of which it burrows, and has already spread from

Oahu to other of the islands. The moth, first noticed in 1900 as a great rarity, is now common in Honolulu, coming to the lights at night. *Nomophila noctuella* is probably a natural and not infrequent immigrant, being abundant locally some years and not noticed at all during others. *Nymphula* is either immigrant or more probably introduced. *Hymenia recurvalis* is almost the most abundant moth in the islands, and not only occurs on the main islands of the group, but also on the small and far distant outlying ones. Its polyphagous larva is a common prey of various wasps of the genus *Odynerus*. Not only foreign weeds and economic plants, but the endemic *Nototrichium* is riddled by these caterpillars. Locally, remarkable aberrations are met with, but always rarely and exceptionally, and it is questionable whether the supposed second species[1] of the genus is an extraordinary aberration or really distinct.

The caterpillars of the genus *Omiodes* have been specially studied by Swezey, who of late years has applied himself to the investigation of the early stages of the native Lepidoptera with great perseverance and success. The larvae of all the species of this genus that are known, with the exception of *O. monogona*, feed on monocotyledonous plants. That species is attached to various leguminous plants and frequently quite spoils the appearance of the clumps of 'wiliwili' trees, that grow in gulches at low elevations in the mountains. Most of the species feed on grasses, sedges, liliaceous plants, palms or bananas. *Omiodes blackburni* is responsible for the defoliation of coconut palms throughout the islands. It attacks also various other palms and more rarely the banana. On the latter are found several closely allied species, which, unlike *O. blackburni*, are restricted to the mountains. It would be premature to state that these banana-feeding species *O. meyricki*, *O. maia*, and *O. musicola* have no other food-plant, but they have not so far been found on others. If it proves that these (and certain other insects) are really restricted to the banana it would strongly influence us in the belief that this plant is a truly native component of the flora and not merely an aboriginal introduction, a belief further strengthened by the fact that one of the most peculiar Hawaiian varieties of banana is said to sometimes produce seed. Another interesting group of species is formed by *O. antidoxa* and its several allies, but the food-plants are more varied in this group, Liliaceae, Flagellariaceae and Cyperaceae being affected. By far the commonest and most ubiquitous species of the genus are those feeding on grasses, e.g. *Omiodes localis*, *continuatalis*, *demaratalis* and that pest of sugar-cane *O. accepta*. These are very abundant, and are seen on the wing or are readily disturbed from the herbage, as one walks along in the daytime. Almost all the species of the genus are attracted by light, and some, unless captured this way, or bred from the caterpillars, are not likely to be met with except by the rarest chance.

Though living in the concealment of retreats, formed by rolling up the leaves of the plants on which they feed, or otherwise hidden, the caterpillars are attacked by many natural enemies. A *Pentarthron* destroys the eggs of some species and the caterpillars are now greatly attacked by *Bracon omiodivorum* (an introduced species) and the Ophionine *Limnerium blackburni*, sometimes also by a species of *Enicospilus* in the latter group. The two common Tachinid flies, *Chaetogaedia monticola* and *Frontina archippivora*, also parasitize the caterpillars. The Pimpline Ichneumons, *Echthromorpha maculipennis* and *Pimpla hawaiiensis*, as well as the very abundant, imported *Chalcis obscurata*, are bred from the pupae. From one of the forest-frequenting species (*O. asaphombra*) Swezey has bred the Bethylid, *Sierola dichroma*, and it is likely that others of this genus will attack other *Omiodes* larvae. In addition to these parasites, various species of *Odynerus* carry off the caterpillars to store their cells. *Odynerus nigripennis* is a constant enemy of *Omiodes accepta* and other grass-eating species, as well as of the leguminiphagous *O. monogona*. The rarer wasp *Odynerus epipseustes* has been noticed hunting for the caterpillars of *Omiodes continuatalis*. The imported social wasps of the genus *Polistes* also use those of various species, as food for their young, while various other polyphagous predators feed on them when opportunity offers.

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[1] This or another allied species has now been found on Maui by Mr J. F. Rock.

The species of *Phlyctaenia* are numerous, twenty-six having been already described, while others have since been discovered. In their larval habits they much resemble *Omiodes*, and some of them are amongst the most abundant of moths. They differ, however, in the fact that the caterpillars are entirely or almost entirely attached to dicotyledonous plants for their food supply, though I have some suspicion that the Omiodes-like *P. heterodoxa* will be found to live on *Sisyrinchium* or some other monocotyledon. In the forest region of the islands many trees or shrubs are attacked by the caterpillars of *Phlyctaenia*. Some species attack very different food-plants, e.g. the common *P. despecta*, which is extremely abundant on *Ipomoea* and various composite plants and occupies with equal success stations near the driest coasts or high up the mountains, where it can thrive in the wettest forests. Such species exhibit considerable variation as is natural, but it is not clear to what extent this is due to climate and to what extent to food-plant. Some of the species, e.g. *P. monticolans* and *eucrena*, vary greatly even when taken in the same station. Many of these moths are easily disturbed in the daytime, as one walks along, or are even on the wing naturally. *P. pyranthes* sometimes flies freely in the sunshine in open places in forests amongst *Vaccinium reticulatum*, on which the caterpillar feeds, being much more abundant than the moth. Like all the other members of the genus this day-flying species flies also by night and is attracted by light. *P. calliastra* was noted as flying freely at the approach of darkness, soon after sundown, then remaining quiescent till midnight or later, the period of activity of this, as of other species, being evidently very short. *P. micacea* may be noticed flying from tree to tree in wet forests, growing on rough lava flows, and settling on the mossy tree trunks. When at rest it raises the abdomen and has in consequence a peculiar appearance.

The natural enemies of *Phlyctaenia* are much the same as those of *Omiodes*, and in addition to these, *P. despecta* is attacked by the Braconid *Chelonus blackburni*. Probably the predaceous *Odyneri* and the parasitic *Limnerium* are their worst enemies. In one case a large number of caterpillars of *P. stellata* (a species extremely common on the urticaceous tree, *Pipturus albidus*) were collected, but only four moths were reared, 85 per cent. having been parasitized by the *Limnerium*, an exceptional death-rate.

The Hawaiian species of *Pyrausta* appear to resemble the *Phlyctaenia* in habits, and are mostly found in the mountain forests, within the rain belt. *P. litorea*, however, frequents dry sandy coasts, the caterpillar feeding on the leaves of that common immigrant plant, *Scaevola koenigii.* The commonest species is *P. constricta*, the caterpillar of which is common in the mountains, feeding on *Scaevola chamissoniana.* The moth is rarely seen on the wing, but is readily attracted to light, on the lower edge of any of the forests of Oahu, where the food-plant abounds. *P. litorea*, on the contrary, is very easily disturbed from amongst the leaves of its food-plant. The latter species is attacked by *Limnerium* and the introduced *Chalcis obscurata* and no doubt all the others will be found to be parasitized by these and other natural enemies that attack *Phlyctaenia.*

Mecyna aurora is a widely distributed species in the islands, but its endemicity is doubtful. Its habits are like those of *Pyrausta* and it feeds on various Compositae, native and introduced. Like the others it is attracted by light. *M. virescens* has all the appearance of an endemic insect. It is extremely variable in colour and chiefly abounds at high elevations, 4000 ft. or more in the mountains. It occurs in great numbers in open places in dry forests composed of *Acacia koa*, *Sophora chrysophylla*, *Myoporum*, etc., and flies readily by day, settling on the herbage, though it is also attracted to light. It favourite food-plant appears to be *Sophora*, which is sometimes badly eaten by the caterpillars. The latter are of bright colours, and were found to form a favourite food of the fine endemic Passerine bird, *Rhodacanthis palmeri.* These caterpillars also eat the leaves of *Acacia koa* and the moth sometimes occurs in places, where no *Sophora* grows, and at much lower elevations than 4000 ft.

The three species of Hawaiian *Loxostege* appear to be rare insects, probably owing to the fact that their larval habits are not known. They are attracted by light at night, but very rarely met with in the daytime. They are usually found in the belt of heaviest rainfall in the mountain forests.

Hyperectis is an endemic genus with only one species at present known, this having occurred on Maui and Hawaii. Probably this moth will be found to be quite variable in its markings, as of the few specimens obtained on Hawaii one is a remarkable aberration. It is attracted to light at night and was once taken on the wing in the daytime.

Margaronia is represented by two entirely dissimilar forms, the conspicuous green *M. exaula* greatly resembling foreign forms, and it must be looked upon with suspicion as regards its endemicity. The caterpillar is sometimes common on, or even injurious to, foreign Apocynaceous trees, grown in gardens in Honolulu. In the mountains it will no doubt be found to feed on trees of the same order, such as *Rauwolfia*, *Ochrosia* and *Vallesia*, and I have seen the caterpillars numerous on what I was told was a species of *Euphorbia*. This moth appears to frequent the lower borders of the forests and is sometimes disturbed from amongst ferns, where it flies wildly and rapidly and is generally difficult to capture. At night it is attracted by light. *Margaronia cyanomichla* is a widely distributed species throughout the islands, especially in the wetter forest regions. It exhibits a good deal of variation, probably in part according to the station it inhabits. It comes freely to light and is rarely met with otherwise.

Mestolobes and *Orthomecyna* are extensive endemic genera, with 30 species in the former, and 14 in the latter already known, and the two monotypic endemic genera *Protaulacistis* and *Promylaea* are offshoots of these. Some of the species of *Mestolobes* (e.g. *M. xanthoscia*, *minuscula*, etc.) are frequent visitors to flowers, flying freely in the sunshine and also at night, while others appear to be entirely nocturnal, and come very freely to light in company with the former. Some may be seen in numbers flying over or settling on ferns in shady places. Most of the species are entirely confined to mountain forests, but *M. minuscula* is ubiquitous, occurring near the sea-shore even on the leeward side of the islands, and thence upwards through the forest-belt. Not infrequently a small swarm will buzz around and even settle upon the person of the collector. In the forests it is usual to find several species in company, and individuals of two or three may be sometimes noticed on a single flower of the Ohia tree. The species that have been examined in numbers are generally very variable in coloration.

In general the habits of *Orthomecyna* are like those of *Mestolobes*, but in a number of species there is a tendency to fly low and settle on the ground or near it. These low-flying species are generally of obscure coloration, compared with the more arboreal forms. Some visit flowers of forest trees and some come freely to light. *O. epicausta*, *exigua*, and *mesochasma* are excessively numerous in certain localities at proper seasons. Some of these, like some of the *Mestolobes*, can be dislodged in extraordinary numbers from bushy trees, in which they are resting during the daytime. Nearly all the species are true forest insects, though they are sometimes found in the open country below or above the forest-belt. None seem to occur on the lowlands, at least not on the leeward side of the islands. Considered generally they do not seem to show any particular liking for the excessively wet parts of the forests, which are frequented by many species of *Mestolobes*. Like the latter, some are extremely variable in markings.

More than sixty species of *Scoparia* are already known, and no doubt many more remain to be discovered. They occur from the lowlands on the windward side to an elevation far above the forest-line on both sides of the highest mountains, but, except accidentally, are not found on the lowlands of the leeward sides. They are most numerously represented in the true forest-belt. As in other countries, they rest in the daytime on the trunks of trees and on rocks, but are easily disturbed, as one walks along. Some settle freely on the ground, in open parts of the forest, where there is a great growth of lichens amongst low-growing plants, such as *Vaccinium*, *Cyathodes*, and *Coprosma*. Many match in colour the lichen growths, that cover the branches and trunks of trees, on which they rest; but, as stated, they are so easily disturbed in the daytime that they are frequently snapped up by the fan-tailed flycatchers (*Chasiempis*) which, but for this habit, they might elude. In dense damp forests, where moss covers the trunks of trees, species with orange, yellow, or ferruginous colour (*S. ianthes, marmarias, nectarias, hawaiiensis,* etc.) are conspicuous; in drier and more open places, black and white species with sharply defined markings (*S. balanopis,* etc.) are often numerous, mixed with the dull and difficult species of the group of *S. meristis*, and the very distinct looking *S. venosa*.

The caterpillars of *Scoparia* feed on mosses and possibly also on lichens. Those of species of the *meristis* group are sometimes numerous beneath moss growing on perpendicular banks or road cuttings. They are much attacked by *Limnerium blackburni*, which may be seen flying along such banks in great numbers, and frequently settling and thrusting its ovipositor through the moss. Other species feed on the mosses growing upon the trunks of trees. Some occur above the forest-line on rocks, on which mosses and lichens grow together. According to Meyrick, "not one of the many species is even moderately variable," but possibly it would be more correct to say that the variability, which exists, though sometimes quite noticeable, is not of such a character as to obliterate the distinguishing specific characters. Apart from the *Limnerium*, above mentioned, nothing is known as to the natural enemies[1] of the Hawaiian *Scoparia*, but besides the flycatchers, *Oreomyza* and *Heterorhynchus* have been seen to catch the moths. The great abundance of individuals of many species is noteworthy, hundreds of specimens being seen around the lights at night in many places. Equally plentifully others are disturbed in open places in the forest region, as one walks along; while in some forests they fly off from every tree-trunk.

The two species of *Lineodes* are widely distributed throughout the islands, but usually not numerous. They are easily disturbed in the daytime from low plants, on which they rest Pterophorus-like with folded wings, and they are also attracted by light. Probably they are most common in the more open parts of the forest, where *Vaccinium* or other low-growing plants cover the ground, yet we have even found one of the species on the dry leeward coast of Oahu, and their endemicity is doubtful.

PYRALIDIDAE.—The two species of *Pyralis* are introductions by man, and of no particular interest. *P. manihotalis* is common in many houses in Honolulu, while *P. mauritialis* is still more common, the caterpillar feeding on the nests of the introduced social wasps (*Polistes*). The latter moth is very readily attracted by light.

PTEROPHORIDAE.—*Trichoptilus oxydactylus* is throughout the group a very abundant littoral or sub-littoral species, extending its range to the forehills. The caterpillar is found abundantly feeding on *Boerhaavia.* This moth is probably a natural immigrant, having a very wide range outside the islands, and it is found on the small outlying islands of the group, e.g. on Midway Is. It comes freely to light.

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[1] Probably they are parasitized by the Bethylid *Sierola*, which has a wide range of hosts in Lepidoptera.

There are four known species of *Platyptilia*, one of which, *P. fuscicornis*, is probably an importation with plants. It is a very common insect, and the caterpillars, which, like the pupae, vary in colour, are found on the flowers of the common weed, *Ageratum conyzoides.* I have bred the same species with several others from flowers of *Lantana camara* sent from Mexico. *P. rhynchophora* is generally distributed throughout the group, wherever *Vaccinium reticulatum* flourishes, at elevations of from 2000 to 9000 ft. above sea-level. The food-plants of the other species are not known.

ORNEODIDAE.—Only two species of *Orneodes* are known, and these have only been taken on Kauai and in the western mountain range of Oahu, but as they are very rarely met with in the perfect state they will probably be found to be more widely distributed. The Oahuan species, *O. objurgatella*, was once bred in large numbers from the drupes, I believe, of *Plectronia.*

GELECHIIDAE.—Represented by 11 genera containing 45 species. *Phthorimaea operculella*, the common pest of the tobacco plant, is of course an introduction, as also is the cotton insect, *Gelechia gossypiella*, and the single species representing each of the genera *Stoeberhinus* and *Autosticha* are also importations, which, owing to their habits, might very probably have been brought to the islands by the natives before the coming of white races. *Merimnetria* represented by a single species, only once captured, is of uncertain status. *Hodegia* with one described species (but of which others are known to occur), *Ptycothrix* and *Catamempsis* also monotypic, and *Psychra* with two species, are developments of *Thyrcopa.* The latter with 26 (and others undescribed) and *Aristotelia* with nine absorb most of the species of the family. The six genera *Merimnetria*, *Hodegia*, *Ptycothrix*, *Catamempsis*, *Psychra*, and *Thyrcopa* are endemic.

The species of *Aristotelia* are found amongst *Gouldia*, and the swellings on the twigs made by one of the species are very common objects. After the escape of the insects these swellings are often the home of more than one species of *Proterhinus* and other insects. *Neolelaps* is bred from these galls, but is probably parasitic on the beetles. The moths themselves are not very often met with in general collecting. The caterpillars are parasitized by the Chalcids of the genus *Eupelmus.* *Stoeberhinus* and *Autosticha* are both common in Honolulu gardens and elsewhere, their larvae feeding on all sorts of dried or dead vegetable matter. They are attacked by the small Braconid, *Microdus hawaiicola.* Both come to light at night, the former in very great numbers, the latter less frequently, but it is often seen at rest on the sides of houses.

It rests with the foreparts much elevated, and thereby has a very distinctive appearance, quite unlike *Stoeberhinus*, some varieties of the female of which it much resembles in superficial appearance. *Gelechia gossypiella* is of recent introduction, and quite injurious to cotton-bolls. It first appeared in the grounds of the Department of Agriculture, and was no doubt imported with cotton-seed. It is parasitized by the foreign Braconids, *Chelonus blackburni* and *Microdus hawaiicola.* The tobacco pest, *Phthorimaea operculella* is also very numerous, and an earlier introduction, having been collected by Blackburn. It is parasitized by the common *Limnerium blackburni.*

Hodegia apatela, a flightless jumping insect with abbreviated wings, is only known in the female sex, the male probably being fully winged. It was found in the wind-swept open country near the summit of Haleakala, and one or two similar forms have been seen on the open lower slopes of Molokai, below the forest region, a locality also constantly swept by strong winds. *Catamempsis decipiens* is very common in the larval state, infesting the Ieie (*Freycinetia*) and sometimes injuring the shoots, but the moth is not very often seen at large. The numerous species of *Thyrcopa* are mostly feeders on dead wood, some occurring in the driest localities, living in the stems of both native and introduced plants, and one of them is common around Honolulu, feeding on the dried droppings of cattle. The moths are, many of them, very readily attracted to lights, and are very numerous in individuals. The caterpillars of some species, however, feed on living shoots, and some live in decaying logs so wet and rotten that the water can be squeezed from the wood. Some of the species are very variable, and in some there is a striking sexual dimorphism. The caterpillars in some localities (especially on the lowlands) are a favourite prey of the wasps of the genus *Odynerus* and *Pseudopterocheilus*, and in mountain districts they are eagerly sought for on the dead branches of trees by various Drepanid birds, e.g. *Hemignathus* and *Heterorhynchus*. We have also found them in the stomach of the little flycatchers of the genus *Chasiempis*, which may be seen investigating fallen decayed tree-trunks in search of this food.

OECOPHORIDAE.—*Ethmia colonella*, the solitary representative of the family, is known to have been introduced. Its food-plant is the 'Kou' (*Cordia subcordata*), a tree no doubt introduced by the natives themselves, who valued it highly. Since the introduction of the *Ethmia*, this tree has been robbed of all its beauty; many indeed have been entirely destroyed, while others are either continually defoliated or have the foliage so riddled by the attacks of the caterpillars as to be unworthy of preservation. The gaily-coloured caterpillars seem to be remarkably free from the attacks of any natural enemies, but sometimes the omnivorous ant *Pheidole megacephala* destroys numbers of them. The moth itself is comparatively rarely seen, though it may be found resting on tree-trunks and occasionally visits lights.

Hyponomeutidae (including Elachistidae and Plutellidae).—Several of the eight described species of *Batrachedra* are known to be attached to ferns, on which the larvae feed. Some of the species are very numerous in individuals and they may be swept or disturbed from ferns in any number during the daytime. Both the wiry *Gleichenia* and soft ferns are affected by the caterpillars. It is possible that all the Hawaiian species are feeders on ferns.

The habits of the three Hawaiian species of *Agonismus*, an endemic genus, and two of *Elachista* are at present unknown. Of *Stagmatophora* the three species, *S. incertulella, S. honorariella* and *S. quadrifasciata*, are no doubt introductions by man. The latter is a common insect in some Honolulu gardens, and generally throughout the islands, on the lowlands, being attached (as is *S. incertulella*) to *Pandanus odoratissimus*, and various cultivated species of this genus. The caterpillars feed internally in the dead leaves and before pupation form a large oval case, which they usually drag inside, between the upper and lower surface of the leaf, in which they have fed. The dead leaves of the trees are often riddled with the holes, from which the cases have been formed. These Pandanus-feeders would be very liable to have been carried around from group to group of the Pacific by the natives in their migrations. *S. sordidella* is doubtfully congeneric with the other species and its habits are not known. *Aphthonetus* with 29 species is endemic. The moths are common on tree-trunks or hiding amongst the foliage of trees and ferns and are readily attracted by light. The genus is connected with *Neelysia*, which contains 31 species, and probably has similar habits, by *Rhinomactrum* (with two species), both these genera being also endemic. Of the great endemic genus *Hyposmocoma* 177 species have been described, forming a varied and probably heterogeneous assemblage of forms, with, evidently, a considerable variety in habits. Many of the moths are extremely common, resting by day on rough tree-trunks, from which some readily take flight on the approach of the collector. Others are disturbed in quantities from amongst dead fern-fronds, or dry limbs of trees, or from dense bushy trees or shrubs, especially certain varieties of the Ohia tree (*Metrosiderus*). Many are readily attracted by lights. A group of yellow or orange-coloured species are very conspicuous objects on the intermediate islands of Maui and Molokai. Some of the species exhibit much variation in colour, and when series of individuals have been collected from a great number of stations it is probable that the discrimination of the species will become a very difficult matter. Some of the caterpillars feed in dead wood or bark of trees and are quite naked, while others form cases of silk mixed with frass or *débris.* These cases exhibit much variety of form and appearance. Some are acute and spiniform, while others are broadly oval; some are dilated at each extremity, or pointed at one end and broadly rounded at the other, others are dilated in the middle. Some, found on lichen-covered trees, greatly resemble the surface on which they rest. Of several species almost incredible numbers may be found attached to rocks or bare vertical surfaces of decomposing lava, where the larvae no doubt feed on the microscopic vegetable growths. They are parasitized by the Braconids *Protapanteles hawaiiensis* and *Microdus hawaiicola* and also by the Chalcid *Omphale metallica*, which is so common on leaf-mining Tineina. Species of the Miscogasterid genus *Neolelaps* are also bred from wood affected by *Hyposmocoma*, but it is not definitely known whether they attack these caterpillars or other wood-eating insects found with them. I believe they are attached to the Coleoptera. The moths are often caught by the little fan-tailed flycatchers (*Chasiempis*) and by the native dragonflies. Though the chief home of *Hyposmocoma* is in the true forest-belt, some occur both below and above this belt. Even in the dry lowlands a few kinds are found, their larvae feeding on the low forms of vegetable life, growing on rocks and tree-trunks. On the wet side of the islands a once numerous lowland fauna has been, no doubt, well-nigh exterminated by the ant *Pheidole*. The habits of the allied monotypic genera, *Dysphoria* and *Bubaloceras*, are unknown. The former comes freely to light at night. *Euperissus cristatus*, the sole exponent of its genus, is very common in the larval state in the dead stems of *Freycinetia*. *Hyperdasys* with four and *Semnoprepia* with three species are found hiding amongst masses of dead fern-fronds or are attracted by light. All these genera, like *Hyposmocoma*, are endemic. *Diplosara lignivora* is a very common insect in the larval state, the cases sometimes being found by scores or hundreds beneath the bark of dead and fallen trees. The moth is freely attracted by light. *Blastobasis inana* is a foreign species and has been bred from stored yams imported from the Orient, though it had previously become established in Honolulu. *Endrosis lactella* and *Oecia maculata* are imported domestic insects, the latter parasitized frequently by *Protapanteles*. *Mapsidius* with three species is an endemic genus, the habits being unknown. The moths appear to be very rarely met with, the very conspicuous *M. quadridentata* was found in the bed of a mountain torrent, having been washed out by the heavy rains. The very variable *Prays fulvocanellus* is a common insect, often disturbed from the branches of trees. It is a true forest insect and almost certainly endemic. *Plutella maculipennis* is a pest amongst cabbages and other Cruciferae, and is of course introduced, there being no endemic Cruciferous plants in Hawaii. *P. albovenosa*, if it has the same habits, will also prove to be an importation. The first-named species is much parasitized by *Limnerium polynesiale*, and it is possible that this will prove to be the same as the *Limnerium* recorded as attacking the cabbage pest in North America, of which I have seen no detailed description.

The Hyponomeutidae with their 276 species are such an important element of the fauna that the following summary is of interest. *Oecia*, *Blastobasis* and *Endrosis* with single species, which are domestic or semidomestic, are introductions by man. So too is *Plutella cruciferarum* and probably also its congener. *Stagmatophora* has three species that are almost certainly introductions, and it is quite likely that the fourth may also be foreign. Leaving out of consideration these five genera with their nine species, there remain 15 genera with 267 species that must be considered endemic. *Prays* with one very variable species, *Elachista* with two (and no doubt others to be discovered) and *Batrachedra* with eight allied forms, some, and perhaps all, attached to ferns, are apodemic genera. The remaining 12 genera are all endemic and seem to be mostly intimately related to one another. Thus *Agonismus* is said to be intermediate between *Batrachedra* and *Hyposmocoma*; *Rhinomactrum* between the extensive genera *Neelysia* and *Aphthonetus*, while other genera represented by one or a few species seem to be special developments of some of these larger genera.

Carposinidae.—Thirty-three species of the genus *Heterocrossa* have been described, and doubtless many others remain to be discovered. The species appear to be often variable and very difficult to separate, a difficulty which will be much increased by the discovery of new forms. The moths are often very numerous, being attracted by light or disturbed from amongst foliage, especially that of the Ohia tree. They are also commonly found at rest on tree-trunks, and once, when sheltering from a heavy rain storm, I remember noticing half-a-dozen examples all close together on a single stem of a tree-fern, none of these individuals much resembling one another, and perhaps each formed a distinct species. The genus is not endemic and a species that I found resting on tree-trunks near Sydney (N.S.W.) had a very Hawaiian-like appearance. The caterpillars attack many kinds of fruit of forest trees and shrubs, e.g. of *Clermontia* and other Lobeliaceae, of *Vaccinium*, *Eugenia*, *Pittosporum*, *Mahoe*, *Sideroxylon* and, doubtless, many others. Others live in buds, e.g. those of *Metrosiderus*. These caterpillars are sought after by the wasps of the genus *Odynerus*, and as many as three dozen have been found in a single cell. They are also obtained by the native birds, while the moths themselves are often caught and devoured by the 'Elepaio' (*Chasiempis*) and by some of the Drepanididae, especially by those belonging to the genus *Oreomyza*.

Tortricidae.—The single species of *Eccoptocera* is one of the commonest of Hawaiian moths and is extremely variable. It is especially attached to *Metrosiderus*, and its caterpillars are much sought after by the wasps of the genus *Odynerus*. There is no reason to doubt its endemicity. *Crocidosema plebeiana* is a natural immigrant, attached to the immigrant plant *Sida*, in the buds of which the caterpillar lives. It is an important food-supply of the larvae of many of the endemic wasps, that frequent the lowlands and lower mountain slopes, since it is excessively numerous and ubiquitous, wherever its food-plant flourishes. Near Honolulu, *Nesodynerus rudolphi*, *Odynerus montanus*, and other wasps are always to be seen searching the 'Ilima' buds in their season for these small caterpillars. *Gypsonoma leprarum* is less abundant and may be an introduction. If not, it is probably a natural immigrant and will be found elsewhere. *Adeloneura* with half-a-dozen species described and others existing, is an endemic genus. The caterpillars live in the pods of the Acacias, *Acacia koa* and *Sophora* *chrysophylla*, and are injurious. *A. falsifalcellum* feeds on the beans in the pods of leguminous plants and also bores in the stems, sometimes destroying the plant.

The endemicity of any of the species of *Cryptophlebia* is doubtful. *Cryptophlebia illepida*, of which long series have frequently been bred, is much more variable in the males than in the females. It is extremely common, the caterpillars feeding in the pods of the imported *Acacia farnesiana* but also on the very different (Sapindaceous) *Nephelium litchi*. It also attacks *Cassia* and other imported pod-bearing trees, in which it resembles the allied *C. carpophaga*, which is known to feed on *Cassia* and *Nephelium*. In the mountains *C. illepida* is injurious to the native acacias, and the other two doubtfully-distinct species, *C. tetrao* and *C. vulpes*, will no doubt also be found on the same. There are five species of *Enarmonia* described. The status of these species is uncertain, as the variability is excessive, being somewhat similar to that of *Adeloneura falsifalcellum*. Examples with very little resemblance to one another are bred from the same brood of caterpillars. These feed in the pods of *Sophora* and of *Acacia koa* in the mountains, and are numerous enough to be injurious in some localities. *Bactra straminea* is a very widely distributed species in the islands and extremely variable, examples differing greatly in size and pattern. Probably several species are really included under this name, for we have observed scores of specimens in some localities, without remarking any special variability. If there is only one species, then the variation is to a large extent local or racial. Melanochroic forms occur and these are sometimes of gigantic size. In some varieties there is constant and conspicuous sexual dimorphism.

Of the subfamily Tortricinae, *Pararrhaptica* is represented by a single species, which greatly resembles some of the species of *Archips*, and, though peculiar to the islands, is probably an offshoot from the other. The species of *Archips*, nine in number, are, excepting *A. postvittanus*, endemic, as also are the very similar species included in *Panaphelix* (monotypic and endemic), *Dipterina* with one species and *Tortrix* with five. So far as is known all these greatly resemble each other in habits, and the borings of the rather large caterpillars in young shoots of *Myrsine* or other trees are often conspicuous and numerous. The moths are not very commonly met with, but some species are attracted to light. In the daytime we have usually disturbed them from amongst dead leaves lying beneath the forest trees, or found some of the prettily coloured green-marked species at rest amongst moss on tree-trunks in wet forests. The abundance of larvae compared with the rarity of the moths is quite remarkable. I think that I have obtained a species of the small Ophionine of the genus *Atrometus* from one of these Tortrices. The imported *A. postvittanus* is an injurious insect and has been found, in company with *Amorbia emigratella*, doing much damage to young fruits on orange trees, but both these species are polyphagous. When inspecting importations, we have found *A. postvittanus* on plants introduced from Australia, on hot-house trees from California, and on others from Mexico. It first appeared on Kauai in 1896, having probably been brought from

Australia with orange trees, as was the Australian Mantid *Orthodera prasina*, the latter being still confined to Kauai. The other importation, *Amorbia emigratella*, was first noticed in 1902, when the larva was already common on orange trees in Honolulu. *A. postvittanus* is a favourite food of *Odynerus*, especially of *O. nigripennis*, and its pupae are parasitized by *Pimpla hawaiiensis*, an imported Mexican Ichneumonid, while its eggs are destroyed by *Pentarthron flavum* (*Trichogramma pretiosa* ?). The other pest is at present much less attacked by natural enemies.

There are 10 species of *Capua*, all forest insects and no doubt endemic. Some of these are readily attracted by light, but very rarely found in the daytime, though sufficiently common. Some are known to be extremely variable. One is abundant in the drier forests, but the caterpillars[1], like those of *Epagoge* (with four species), have not been bred.

It will be seen that the Tortricidae present a great difference from the Hyponomeutidae in that there are no extensive endemic genera, the monotypic *Pararrhaptica* and *Panaphelix* being closely allied to apodemic ones, while *Adeloneura* has only half-a-dozen species, mostly small obscure insects, of which congeners might at any time be found elsewhere.

Tineidae.—The two species of *Opostega* are endemic and the perfect insects are probably difficult to collect. *O. dives* was found only once, the two individuals were taken running on a leaf of *Pelea* in the sunshine and one was noticed ovipositing. It is possible that the curious circular mines, that are so conspicuous in various localities in the thick leaves, are formed by the larvae of *Opostega*[1]. From these mines one generally breeds only Eulophid parasites. *Opogona aurisquamosa* is an imported insect, easily carried in the larval state with coconuts, sugar-cane, bananas and other plants. It usually feeds on dead or dry vegetable matter and is polyphagous. One or two other species, that have reached the islands on imported plants, have been intercepted and destroyed. The imported larvae of a pretty species, infesting the drupes of coconuts in Samoa, have more than once been bred to maturity. The species of *Ereunetis* are all no doubt introduced, their habits being in some cases like those of *Opogona*, *E. minuscula* and *E. flavistriata* being easily carried about with sugar-cane. In fact, another species, that infests cane, has still more recently been imported and become very numerous, even in some mountain forests. The dry leaf-sheaths of the sugar-cane afford a favourite food for the caterpillars, which hide between the sheath and the stem. Of *E. zebrina* little is known. Blackburn took it in Honolulu and I found my specimen on a trunk of the Kukui tree, also on Oahu. *E. simulans* is very abundant, the caterpillar feeding on dead bark of trees and the moth sometimes is common round the lights or may be seen resting on tree-trunks. It is found from the coast to an elevation of about 1800 ft. in the mountains and occurs in gardens in Honolulu. The caterpillar is sometimes parasitized by the Braconid, *Microdus hawaiicola,* and I believe also by a now very abundant species of Chalcididae (*Hockeria*) of recent introduction and not included in the systematic portion of this work. *Philodoria* is an important endemic genus with seven species described. The mines are very conspicuous in the leaves of the urticaceous *Pipturus*, many examples of *P. micropetala* sometimes being bred from a single large leaf. *P. splendida* is attached to *Metrosiderus* (Myrtaceae). In wet boggy forests we have noticed mines in quite different plants, amongst these being *Myrsine*, but *Pipturus* certainly is the food-plant of more than one species. Of *Gracilaria epibathra* the habits are not known, but *G. marginestrigata* is a very common insect, the larval mines in the leaves of *Sida* being very conspicuous. Besides this malvaceous plant it also mines the solanaceous *Datura stramonium* and some others. Other species of this genus are known, but have not been described in this work. Both *Philodoria* and *Gracilaria* are frequently parasitized by *Omphale metallicus*, and other minute Eulophidae. The four species of *Bedellia* are of some interest. One has been referred to the European *somnulentella*, and one to the American *minor*. The latter is very common, the larvae mining the leaves of *Ipomoea* of various species. The former, however, as well as the two species described as new, seems to occur in localities quite beyond the range of any Convolvulaceae, and to have some different food-plant. *Setomorpha dryas* is an introduced insect, and *Acrolepia aureonigrella* may come under the same category. The three species of *Monopis* and *Tinea* are of course importations and without interest, while the unique insect, for which the genus *Paraphasis* was made, is of uncertain status.

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[1] Species have since been reared from sandalwood by Mr H. Swezey, and *Opostega* has been bred by him from *Pelea*.

Review of Neuroptera.

One hundred and sixteen species of Neuroptera (s.l.) have been enumerated in the systematic portion of this book, and these represent but six families of the Order. If one excludes the Psocidae, of which very many species have been imported with plants from other countries (these species, however, not having been enumerated in this work), the Neuroptera are singularly free from artificially imported species, more so, indeed, than any other Order. There are, however, several species, which, we can be sure, are natural immigrants, viz. the three dragon-flies of very powerful flight, *Pantala flavescens*, *Tramea lacerata*, and *Anax junius*, all species of wide range and inhabiting the American continent. A small white ant[1], destructive to houses and woodwork all over the islands on the lowlands, has been established for many years, having, no doubt, been brought in with lumber. A few are of doubtful status, the Embiid, *Oligotoma*, and the Hemerobiid, *Megalomus hospes*, being probably either natural immigrants or endemic, while the ubiquitous *Chrysopa microphya* is more likely an importation. In

[1] One if not two other species of Termites have more recently been introduced into Honolulu.

the Hemerobiidae, one genus, *Nesomicromus*, of the Hemerobiinae, contains 22 known species, *Anomalochrysa* of the Chrysopinae 29, *Agrion* of the Odonata 26, *Psocus* of the Psocidae 14, and *Elipsocus* 10. No less than 101 of the species of Neuroptera are consequently distributed in only five genera!

Many families or even greater groups are totally unrepresented. Thus there are no Trichoptera, Perlidae, or Ephemeridae of the aquatic groups, no Mantispidae, Panorpidae, Ascalaphidae, etc., of the terrestrial forms.

HEMEROBIIDAE.—The single species referred to *Megalomus* is a rather common forest insect throughout the islands, the habits of which are very imperfectly known. It exhibits some rather remarkable variations, and though allied forms will, no doubt, be found elsewhere, it may itself prove to be endemic. We have not seen species from other countries having the same peculiarities of neuration, which will no doubt exclude it from the genus *Megalomus* properly called. It flies at dusk and sometimes is attracted by lights in the nighttime, hiding by day amongst dead leaves attached to trees, and amongst dead fern-fronds. When beaten from these it feigns death like others of the group.

The species of *Nesomicromus* exhibit a great variety of appearance, some having the remarkable contour of the wings of *Drepanopteryx*, though of course not allied to this, while others hardly differ from some species of *Micromus*, described from other countries. The more remarkable forms appear to be related to and connected by intermediates with the more commonplace ones. They are a difficult study, since many are so rare as to have been very imperfectly examined, and the difficulty is increased by the variability of the neuration and other characters. With the exception of *N. vagus*, which occasionally ranges to the coast, all are forest insects, many of them, as has been stated, rarely or very rarely collected. On the other hand *N. vagus* is often met with in great numbers. Mostly they frequent trees or ferns infested with Psocidae, on which they prey, but some, and especially those which are found most numerously, attack Aphidae. Amongst the latter may be mentioned *N. vagus*, *minimus*, and *fulvescens*. One is tempted to think that the greater abundance of such species is due to this habit, the large number of Aphidae, which have become imported with various plants, affording a more abundant pabulum. Probably Aphidae were entirely absent from the endemic fauna. *N. vagus*, the most successful of all the species, now sometimes abounds outside the forest in fields of sugar-cane attacked by *Aphis sacchari*, on maize, etc., and in the mountains we have found it in enormous numbers on the rare tree *Gossypium drynarioides* infested by *Aphis gossypii*. On one occasion the capsules of the latter plant were found full of the cocoons of *N. vagus*, the larvae having crept within for the purpose of pupation. If, as is probable, the Aphidae were absent from the fauna until they were imported by man, it is most likely that the Psocidae and small Homoptera previously supplied the sole food of

Nesomicromus, and their present diet of Aphidae is a return to the normal food of the family in other countries.

The genus *Pseudopsectra* is clearly an endemic offshoot from *Nesomicromus*, the posterior wings having become reduced to lobes, and the insect itself flightless. *Nesothauma* is a still more remarkable form, the hind wings having entirely disappeared, while the front ones have become hard like the elytra of a beetle, and their fringes have also vanished. It is allied to *Pseudopsectra*, and has been found in company with it, on trees covered with dense growths of lichens and harbouring many Psocidae. It varies much in colour, so that examples taken in the same locality appear superficially distinct from one another. The insects comprising these two genera are amongst the most remarkable of known Hemerobiidae.

Of the subfamily Chrysopinae one species of *Chrysopa* (*C. oceanica*) was brought back by the Beechey expedition more than three-quarters of a century ago, and has not since been met with. Probably it frequented the lowlands, and has become exterminated. In this connection I may add that a species of this genus is known to me from the far outlying island of Midway, but I do not know whether this is the same as the other, opportunity for comparison of description or specimens not having occurred.

Another species, *Chrysopa microphya*, now ubiquitous on the lowlands, and at moderate elevations in the mountains, is, I feel sure, a comparatively recent introduction. Its larva attacks many small insects, such as various scale insects or Coccidae, Aphidae, young leaf-hoppers, etc., and being numerous, it is decidedly beneficial. The larva carries the empty skins of its prey on its back in the usual manner, and the eggs are of the usual stalked form. The pupae are parasitized by a well-known American *Hemiteles* of the Ichneumonidae, but the proportion so destroyed is small.

Apart from these species all the Chrysopine Hemerobiids belong to the endemic genus *Anomalochrysa*, itself no doubt capable of subdivision, and embracing a wide variety of forms, 29 species having been discriminated. The eggs are simple, not stalked, and several are frequently laid side by side. They are parasitized by a species of *Pentarthron*, of the family Trichogrammidae (Chalcidoidea) which, however, may have been introduced. The larvae, some of which have been found preying on caterpillars, are often gaily coloured, the colouration sometimes resembling that of the adults, being green or yellowish, with a crimson or bright yellow mediodorsal stripe. The larger ones are able to give a sharp bite, when they fall on the bare skin. The adults are mostly entirely nocturnal, I think, though some of them are very easily disturbed by day. In open places in the forest, where the growth is short and scanty, and also in some places above or below the forest, *A. montana*, a small fragile species, often flies up as one walks along, and may even be on the move without being disturbed. I have seen this or an allied species in incredible numbers, when on my way in the early morning hours from the coast at Kawaihae to the uplands of Waimea on Hawaii.

Very few species, however, are found outside the belt of dense forest. *A. rufescens* occurs on the lowlands, as well as in the mountains, and may even be seen in Honolulu. We have found the females in numbers fluttering slowly about the foliage of Kukui trees at dusk, and ovipositing on these. The male is one of those remarkable for the extraordinary structure of the costa of the front wings. It and several others became numerous in the upland cane-fields of Hawaii during the worst period of the attack of the sugar-cane leaf-hopper (*Perkinsiella*), their larvae preying on this pest. No doubt in the forests they likewise destroy the endemic leaf-hoppers, though as above stated we have seen them sucking caterpillars of the genus *Scotorythra*. Many of the species of *Anomalochrysa* are remarkable for their variability in colour, and in characters of neuration. This variability renders the distinction of the species more difficult, so that the number of these may be subject to some correction, though probably the error is not great. The females lack some striking characters shown by the males, and are the more difficult to determine. Neither any of the species of *Anomalochrysa* nor *Chrysopa microphya* possess the offensive odour characteristic of some of the Chrysopae of other countries. Certainly *Anomalochrysa* is one of the most interesting components of the Neuropterous fauna, and an exact study of the variations of some of the species would be very desirable. Unlike *Chrysopa microphya* the larvae of *Anomalochrysa* are quite bare, not covering themselves with *débris* nor with the skins of their prey as the other does.

MYRMELEONIDAE.—The two species of *Formicaleo* appear to be allied to one another, but to have rather different habits. *F. perjurus*, the smaller species, is, doubtless, much rarer than it formerly was, and has entirely disappeared from some of the localities, where it formerly occurred. I have never myself met with this insect, but I once found a solitary larva, which I suspect belonged to it, beneath a stone on the edge of the stream in the Iao valley, Maui. It might almost have been said to be actually in the water. Three-quarters of a century ago this insect appears to have occurred near Honolulu, probably in the Nuuanu valley. The larger ant-lion, *F. wilsoni*, is a common insect on the driest lava-fields of Hawaii, where there is a scanty vegetation or the surface is barren. It occurs near the coast as well as at elevations of from 4000—6000 ft. above the sea. It is readily disturbed, as one walks along in such localities, by day, usually settling down again after no very long flight. We have seen it taking more extensive and higher flights at nightfall. The habits of the larva are not known, but probably it lives beneath stones or in cavities of the porous lava, as no burrows have been noticed where the species is common. It cannot prey on ants, for these do not exist in the uplands, where the ant-lion abounds. Some of its haunts are so barren that one may well wonder what insects are numerous enough to support the many larvae that must occur.

Embiidae or Embioptera.

Oligotoma insularis, the sole representative of this small family, is a common insect on the lowlands, and in dry places in the mountains to an elevation of some 2000 ft. above the sea. Blackburn reported it as occurring in the thatch of native houses, but it also is abundant under stones, amongst *débris* of fallen leaves and twigs, in the cavities of dead twigs and branches, and beneath the webs that it spins on the exposed trunks of large trees, in fact in many situations. Frequently small colonies of larvae, nymphs and adults are found in company. The winged males fly at night, and are attracted by light, and their appearance somewhat suggests that of certain Perlidae, their movements somewhat those of *Raphidia*, or still more of small exotic Mantidae. In whatever situation they are found they spin galleries of silk, along which they can travel rapidly either backwards or forwards. If the species is really endemic, which is very doubtful, it is one of the very few native species, not specially protected, which has escaped destruction from foreign predaceous insects in the lowlands. Possibly the galleries in which it lives may have saved it from destruction. Though here placed in the Neuroptera, *Oligotoma* would be less out of place amongst the cursorial Orthoptera.

Termitidae or Isoptera.

Only two Termites of the genus *Calotermes* are recorded in this work, but during the course of publication, one, if not two, other species have been imported, and are probably established. The names assigned to the species by McLachlan and adopted by me were given on the examination of winged examples only, and their correctness is very doubtful. The smaller species is clearly introduced, inhabiting houses and woodwork throughout the islands, but is not a forest insect. It has done much damage in Honolulu and other settlements, attacking many of the more choice woods. On the other hand, the larger species is a true forest insect, being particularly fond of dead Koa trees or the dead parts of living trees. Communities, however, are also found in detached logs of this and other wood, when lying on the ground. This species is variable, and examples of the soldiers taken from communities on different islands showed marked differences in the form of the underside of the head. The communities are often very large, occupying all parts of the trunk and branches of a large dead tree. The soldiers have distinct eyes, and a number of kings and queens may be found in one colony. The latter do not exhibit any noticeable post-metamorphotic growth, such as is so remarkable in the queens of many other Termites.

Psocidae or **Psocoptera.**

The species of this family are numerous, and very imperfectly known. The endemic forms appear all to belong to two types, each with numerous species, representing the genera *Psocus* and *Elipsocus*. Many of the species are very variable and also closely allied, and as they are fragile and often indifferently preserved, they are difficult to study. They are common throughout the forests of all the islands, and endemic species still occur near the coast in a few places. Of recent years great numbers of foreign forms have been imported with living plants, so that these are now found in every garden, and some, and probably many, of these have extended their range into the forests, and invaded the habitats of the endemic species. No doubt the existence of the native Psocids in the islands is very ancient, as they are well known to form the prey of other endemic creatures, e.g. the representatives of the Hemipterous family *Emesiidae*.

Odonata.

The two foreign dragon-flies, *Pantala flavescens* and *Anax junius*, are extremely common insects, both being particularly abundant on the lowlands, and they range throughout the islands. *Tramea lacerata*, though not a rare insect, has been much less successful. It too is essentially an insect of the lowlands, or at least of low elevations.

Anax strenuus, superficially similar to *A. junius*, but much larger, belongs rather to the mountains, and may be found five or six thousand feet above sea-level. At moderate elevations of 1500 to 2000 ft., both these species breed freely in the pools of the mountain streams, and we have taken the male of the one attached to the female of the other on several occasions. I captured three such pairs in the course of two days, when collecting in the mountains near Waialua on Oahu. Owing to the peculiar method of copulation in dragon-flies, it is not possible to say whether this truly took place or not. Apart from size, these two species of *Anax* are quite distinct by other characters. As might be supposed the endemic *A. strenuus* is a very powerful flier, and on big streams and in open country is difficult to catch. Where they breed in small streams flowing down narrow gulches, or in pools in small ravines, as they continually pass and repass in their flight up and down, they may be easily taken. On the larger Wailuku river near Hilo, where they were abundant, they were easily killed with small charges of dust shot, as they flew over the surface of the water.

Nesogonia blackburni, a somewhat remarkable endemic dragon-fly, occurs on all the islands in the mountains. It is often observed in localities where very little water is to be found. This is due to the fact that it breeds in the small temporary pools that remain for a time after heavy rainfall, as well as in small and easily overlooked water-holes, that are of a more permanent nature. We have sometimes seen it in large numbers together, but more usually few or scattered specimens are noticed. On one occasion in a sheltered corner of a deep gulch on Molokai scores of examples could be seen at once resting with expanded wings on the dried stems of some low plant, nearly every stem having an occupant. Each day for a considerable period they were observed congregated in this favoured spot, but only during the late hours of afternoon sunshine. This dragon-fly exhibits much variation in colour, size, and other respects, and both general variability and local are evident.

The twenty-six species assigned to *Agrion* form by far the most remarkable portion of the endemic dragon-fly fauna. The variability of many of the species, in characters that are considered important, is unusually great. In some species the post-ocular spots may be conspicuous, reduced, or entirely absent, according to the individual. Other varieties in colouration may be still more striking. *A. amaurodytum*, for instance, may be an entirely blackish insect, with much bluish white pruinosity on the head, thorax and the base of the abdomen, or it may be of a more metallic black with conspicuous thoracic pale markings, or in addition to much pale ornamentation the abdomen may be largely red. There is very great variability in size of the individuals in many species. There is much general variation in examples taken in the same locality; in some cases there is sufficient difference between the aggregate of individuals of a species from one island and those inhabiting another to form more or less distinct races or subspecies. Thus the two species, *A. amaurodytum* and *A. calliphya*, are of much smaller average size on Hawaii than on the intermediate islands of the group, and their neuration is consequently affected.

The neuration of many of these Agrions shows much variation in detail, and this not merely in small points, but the more important features are in a plastic state. McLachlan, when he received material from Blackburn for description, some thirty years ago, formed a new genus for the reception of two species sent to him, calling this genus *Megalagrion*. This genus was essentially based on the neuration of the post-costal area of the wings, a number of the cellules in this area being doubled, instead of forming a single row. When, however, a more extensive collection of Hawaiian species is examined, it is found that this duplication of cellules exists in all stages of development. Species that normally have a single post-costal row of cells sometimes have a number of these divided to form a double row. In some cases the post-costal area is simple on the wings of one side of the insect, partially double on the other. A similar phenomenon is also shown in the series of post-pterostigmatic cellules, where a similar complication of neuration takes place, some species always having more or less a double row, others having sometimes a single and sometimes a partially double row, or the wings on either side may be different.

It is clear that increase of size of the insect favours duplication of the cellules, though it does not always necessitate it. Thus the three large species, which would more properly form McLachlan's genus *Megalagrion* (if that be retained) always have the complicated post-costal area to a greater or less extent. Some division of the cellules generally occurs in the large species *A. kauaiense*, on one side or the other, or in one or other pair of wings (fig. 1a, 1b, post-costal area of right and left front-wing). A large example of *A. deceptor*, as will be seen from fig. 2, has the post-costal area between the 7th and 16th cellule considerably complicated by division, though typically this species has a simple row of post-costal cellules. A small race of *A. calliphya* (named var. *microdemas* by me) is found on Hawaii. A dozen examples, taken at random and examined, all have a simple row of post-pterostigmatic cellules (fig. 4a and 4b) in both front and hind wings, whereas a dozen examples from Molokai, Lanai, and Maui, nearly all have this area more or less complicated by division of cellules (fig. 3a, 3b). In some of the smallest species of the genus the post-pterostigmatic and post-costal areas rarely, if ever, show any tendency to duplication of their cellules.

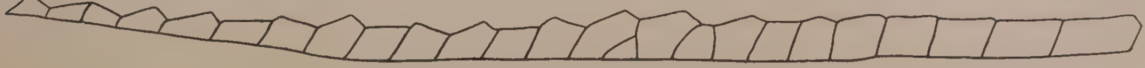

FIG. 1 a.

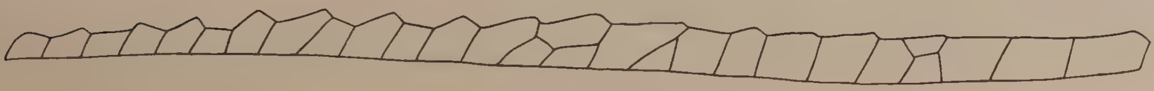

FIG. 1 b.

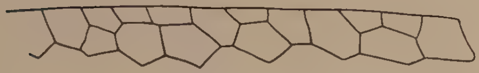

FIG. 2.

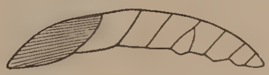

FIG. 3 a.

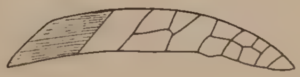

FIG. 3 b.

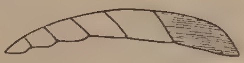

FIG. 4 a.

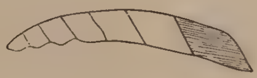

FIG. 4 b.

In many of the red-bodied species a tendency to melanochroism is a common form of variation. This tendency is particularly noticeable in individuals found in certain localities. In dealing with the three large, allied species, *A. blackburni*, *oceanicum*, and *heterogamias*, I remarked that the females of the latter were easily distinguished from those of the other two by the fact that the abdomen was not at all red, but entirely dark. At the time, I had seen a large number of examples of each of these species. Subsequently, however, I found that in other localities on Oahu (to which island it is confined) *A. oceanicum* also had a female entirely lacking the conspicuous red colour of part of the abdomen, and further in some localities this form much predominates.

Still later, on the island of Hawaii similar dark-bodied females of *A. blackburni* were observed, whereas those previously taken there (though in other localities) were red-bodied, as were all those found on the islands of Maui, Lanai, and Molokai.

Hitherto no dark-bodied form of the male of any of these species has occurred, all being largely red, nor has any red-bodied female of *A. heterogamias* (which is peculiar to Kauai) been found. Thus, it may be said that the females of *A. oceanicum* and *A. blackburni* are dimorphic, whereas the female of *A. heterogamias*, so far as is known, is not. Consequently *A. heterogamias* always exhibits striking sexual dimorphism. *A. oceanicum* and *A. blackburni* do so; when we consider the dark-bodied form of their females; but when we compare the red-bodied form of this sex with the other, the sexual dimorphism in the latter two species is much less marked. In other countries, Agrionids, the males of which are red-bodied, exhibit similar dimorphism in the females. Cases wherein black-bodied species are dimorphic, having a red-bodied[1] form in the male sex, are very rare, and I do not feel sure of having met with such, except in the case of *A. amaurodytum*, and but rarely in that species.

Extensive melanochroism of the (normally) largely red-bodied male of *Agrion deceptor* is common locally, and other species are affected less frequently, and in a lesser degree.

Only the very driest coastal regions of the islands and the highest elevations in the mountains above the region of streams and forest are devoid of any species of *Agrion*. *A. xanthomelas* is a common insect in Honolulu gardens and in lowland districts generally, not usually partial to the mountains, though in the Kona district of Hawaii it is common about stagnant pools up to an elevation of about 3000 ft. It is very numerous in individuals under conditions totally changed from the natural; perhaps it now finds more numerous breeding places, and a more abundant prey in the numerous insects that have been introduced by man in the region it frequents. *A. hawaiiense*, another small species, is more local than the preceding, but also seems to generally breed in stagnant water. Where it frequents streams, like that of the Iao valley on Maui, we have noticed that its chief haunts are quiet small pools, often cut off, or at a distance, from the main stream. It also breeds numerously in upland ponds of considerable size, where these occur. *A. deceptor*, *microphya*, and *nigrohamatum* also sometimes breed in stagnant pools of water, but more often in the streams themselves, or at least in pools left standing in the beds of streams, when these cease to flow. Most of the other species breed usually in running water, but on one occasion we found the nymphs of the large *A. heterogamias*[2] numerous amongst dead decaying leaves lying on the ground, and saturated with the wetness oozing from a perpendicular bank, at the foot of which they lay. There was no standing water, and the spot was at some distance from a river, and had no connection with this. From this the transition of habits is not very great to what may be considered the true terrestrial, or one might in some cases say, arboreal species. These (*A. koelense*,

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[1] Teneral or immature examples, which instead of having a black or metallic-black abdomen, have this of dirty red or pitchy colour, are not to be confused with truly red-bodied examples.

[2] The nymphs of the allied *A. oceanicum* are sometimes found in the wet moss on rocks in stream-beds, and the young ones are preyed upon by the larvae of *Rhantus pacificus*.

A. asteliae, *A. oahuensis*, and others) deposit their eggs amongst the leaves of various plants which usually retain some moisture at the base, where they clasp the stem. Such plants are the climbing Ieie (*Freycinetia*) and the liliaceous *Astelia*. Here the nymphs, which are short and stout as compared with some of the slender stream-loving species, are found in numbers, those of several sizes often living in company. In wet weather, when a little water may collect at the bases of the leaves of the *Astelia*, we have noticed that the nymphs will often be found to have crawled half-way up the leaf, as if they actually disliked the wet! Both the *Astelia* and *Freycinetia* being favourite habitats of a number of native insects, it is probable that these nymphs fare fully as well as those frequenting the water. Thus the bases of these same leaves, and the decaying rubbish that accumulates there, are the haunts and breeding-places of various Nitidulidae and Carabidae, of small Diptera and their Hymenopterous parasites, of Lepidopterous larvae, of Hemiptera and other insects, as well as of others which casually seek shelter, and of the young of small land Molluscs. In consequence of their habits, these species of *Agrion* are frequently found in places quite remote from streams or standing water. The caudal appendages of the nymphs and the mask are much shorter than in some of the water-frequenting species, though there is much difference between some of the latter themselves in this respect.

The food of the adult Agrions consists to a large extent of small moths. We have also seen them take daddy-long-legs (Limnobiinae) and leaf-hoppers, and no doubt they prey on any small insect that flies by. The larger species, *A. oceanicum*, etc., not infrequently prey on the smaller, and themselves are devoured by the large endemic, *Anax strenuus*, and the immigrant, *A. junius*. On one occasion I caught an *Anax junius* devouring a male of *Agrion oceanicum*, which itself still retained hold of the small and delicate species, *A. leptodemas*, partially eaten. *Agrion blackburni* has been found devouring *A. nigrohamatum*, a species of considerable size, though much more slender than itself.

Considering the apparent scarcity of food, owing to the absence from the mountain streams and pools of more fragile water insects, such as Ephemeridae, Perlidae, Culicidae, etc., the abundance of the Agrions is quite remarkable.

To what extent the species of Neuroptera (s.l.), at present known only from a single island, are really confined to one, is at present in many cases uncertain, owing to the fact of their rarity. There is little doubt that the endemicity of the Kauaian species is in most cases real, for though the dragon-flies of Oahu have been much collected, yet of the 10 *Agrion* known from Kauai only two (which are generally distributed over all the islands) have been found on the neighbouring island. Otherwise the species of *Agrion* are frequently of wide distribution over the islands. Thus Oahu has four species (40 per cent.) endemic, and ranks next to Kauai, while Molokai, Maui, and Hawaii[1] have each but one species endemic, and Lanai has none.

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[1] The species (*A. nesiotes*) supposed to be peculiar to Hawaii is now known from Maui.

The endemicity of the less easily collected Hemerobiidae cannot be properly estimated till much larger collections are made; but in its Chrysopinae there is no doubt that the island of Hawaii is disproportionately rich. It is now well-known that some species originally recorded from a single island are by no means confined to one, but range over two or several.

Review of Diptera.

The Diptera (excluding the Pupipara) are represented by 26 families, 10 of which, I believe, contain endemic species, and 13 only imported ones, the families Ephydridae and Agromyzidae being doubtfully represented by endemic forms. Excluding these latter, the native fauna belongs to the Mycetophilidae, Chironomidae, Limnobiidae, Dolichopodidae, Pipunculidae, Sarcophagidae, Anthomyidae, Trypetidae, Drosophilidae, Asteidae. In addition to these the Pupipara are represented by three species of *Olfersia* (Hippoboscidae), one of which is described from the islands, the other two are known elsewhere. Though found on the native Passerine birds, they also occur on wide-ranging sea-birds, and can only be considered as immigrant species. Excepting perhaps some of the metallic-coloured Sarcophagidae and a few of the largest Drosophilidae, the endemic flies are all of small size and of the most obscure superficial appearance. They have only been specially collected to a small extent and the number of those described can be but a fraction of those that exist. The extraordinary development of the Drosophilidae, in structure and in the number of species, is the most striking feature of the Dipterous fauna. The number of described endemic species of Diptera is only 135, while the introduced ones number 57. The former are contained in 27 genera, the latter in no less than 46.

MYCETOPHILIDAE.—This family is probably represented by endemic species of *Sciara* and *Platyura*, and as its members have been little collected other species and even genera are likely to be found. If preserved as dried specimens, these insects are subject to much distortion after death and often become hardly recognizable. It is probable that the truly endemic forms are numerous, the larvae being very plentiful in decaying vegetation, where they are preyed upon by the small Carabid beetles, and, if they have been exposed, are also seized upon by minute carnivorous flies belonging to the Dolichopodidae. A number of species have been imported with foreign plants and have become very abundant, so that it may not be very easy to discriminate the foreign from the native species in these obscure flies.

CHIRONOMIDAE.—*Chironomus Hawaiiensis* is one of the commonest of insects, especially near the coast or on the lowlands. Its status as a native insect is very doubtful. Being freely attracted to light, it often swarms in the verandahs of houses, and forms a considerable part of the food of some of the lizards that haunt the same situation. The smaller Chironomids such as *Tanytarsus* and *Ceratopogon* are found in the mountain forests and the species may prove to be endemic. They have not been specially collected and the number of species that exist is quite uncertain. Some are also found on the coast, and about the salt marshes in the lowlands.

More interesting than any of these is an aquatic black insect, which often frequents strong mountain streams like that of the Iao valley in Maui. Mr F. W. Terry, who has studied its life-history, informs me that this species is of an undescribed genus, allied to *Telmatogeiton*. I observed it in great numbers in 1894 in the above-mentioned locality, when the river being in flood the flies were usually to be found sheltering behind large rocks projecting from the stream. They are also found on other of the islands, and are almost certainly endemic and an interesting addition to the scanty fauna of the freshwater streams. As a rule this insect preserves badly in dry specimens, and probably for this reason was not described in the systematic part of this work. In life, when I first observed it, it appeared to me one of the most remarkable of the island Diptera.

Psychodidae.—Only two species of *Psychoda* have been recorded, though one or two others have been observed. They are certainly all importations by man, and two of the species have been bred from cow-dung and from wet soil. They are of no interest in connection with the Hawaiian fauna.

Culicidae.—The two species of *Stegomyia*, *fasciata* and *scutellaris*, are well-known to all inhabitants as the 'day-mosquito,' owing to the fact that they are active at irregular periods between daybreak and dark, whereas the 'night-mosquito' or *Culex* is active at dusk and throughout the night. All have been imported by man and there is no native mosquito known, nor any true native name for a Culicid. *S. scutellaris* is of comparatively recent importation, as it did not come under my notice during the earlier days of my collecting, though now very numerous and conspicuous. Both it and *S. fasciata* are very troublesome not only on the lowlands but also in parts of the lower forests, where in the absence of pools or streams they can breed in great quantities in the small collections of water that form in hollows of the limbs of trees or where these join the trunk, as well as in the centres of decaying stumps. They do not generally seem to range upwards above an elevation of about 1500 ft. The *Culex* is also a species frequenting the coast and lower elevations, though exceptionally it has been found as high as 4000 ft. above the sea. *S. fasciata* is, as is well-known, a species of notoriety from its connection with yellow-fever, a disease at present unknown in the islands[1], and we suspect that *S. scutellaris* has a similar connection with the fever called 'dengue' (which is sometimes epidemic), though others would attribute this to the *Culex*. For the latter, two specific names have been received from authorities at Washington and a third from the British Museum, so we are doubtful as to which it really belongs. Having no faunistic interest we have not specially inquired into this matter.

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[1] A case of yellow fever has since been reported.

LIMNOBIIDAE.—The species of *Dicranomyia* are endemic, and to the five described, others and perhaps many more will, no doubt, be added. They are common insects, sometimes attracted by light and sometimes observed at rest in the daytime, or on the wing in the dark cavity of some hollow tree. In the latter case a number are usually seen flying together, rising and falling in their flight in the narrow space of a few feet. We have bred one or more species from decayed wood, overgrown with damp moss. These fragile flies are the favourite prey of the endemic predaceous wasps of the family Mimesidae, and some of the Crabronidae likewise gather them. Consequently one may find the females of these wasps investigating damp, dark places, where the *Dicranomyia* are likely to be found, but which ordinarily would have but little attraction for such sun-loving insects.

The single species of *Limnobia* is common in Honolulu (and elsewhere) and is I suspect introduced. It has been bred from damp moss. The *Trimicra* is also of doubtful endemicity. *Styringomyia didyma*[1] is extremely common near the coast around Oahu and perhaps on the other islands. It sometimes swarms at night around the electric lights, sitting quietly on the walls and ceilings, with the body pressed closely to the surface, and the front and middle legs extended straight forward in front of the head in a characteristic manner. We have found this or a very closely allied species, as well as a much larger species, in Australia, and should its habits prove it to be liable to be carried by ships, we should consider it an importation into the islands.

STRATIOMYIDAE.—There are three species, all doubtless introductions by man, though two have not been yet identified from elsewhere. Of the two smaller species one a *Sargus* was already found in Honolulu 30 years ago, the other, *Acanthina*, has been evident for only about 15 years.

The conspicuous *Neoexaireta spinigera* is also of recent introduction, not noticed in 1897, but already common round Honolulu in 1900. It enters the lower forests and the larvae abound beneath the bark of some of the native trees, when in a decaying condition. This fly is now frequently carried off by the endemic fossorial wasps (Crabronidae) for the provisioning of their nests.

SCENOPINIDAE.—Like the above family this has no special interest to the student of the fauna. It is represented by only one or two foreign species of domestic habits.

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[1] This species was subsequently bred by Mr F. W. Terry and I should consider it to be a probable introduction by man.

Dolichopodidae.—The two species of *Gnamptopsilopus* are no doubt introductions, *G. patellifer* having been long established, and it is one of the commonest of flies. *G. pallidicornis* is of recent introduction; it was first noticed in 1896, was more common in 1902 and is now still more frequently seen. Both are frequently bred from soil in which young plants are being raised. On the other hand the species of *Campsicnemis* and *Chrysotus* are endemic, and no doubt many new ones remain to be collected, as they are found throughout the forests, often in abundance. Unfortunately most of the small and obscure Dolichopodidae have very soft integuments so that in a few days or even hours after capture they become shrunken and distorted and almost useless for descriptive purposes. They require special collecting and preserving, and it would be safe to say that of this family at least 100 species might be procured in the islands. Several species that frequent wet moss have the wings reduced to filaments and are of course quite incapable of flight, but these interesting forms appear to shrivel and distort after death and should be preserved in alcohol. Many of the smallest species live on the ground beneath the shade of the trees, not only in wet but also in dry forests, and if the dead leaves be swept aside and the damp earth exposed, they are readily attracted thereto, and prey on the minute larvae of mycetophilids or other delicate creatures, that are exposed amongst the disturbed *humus*. The little flightless *Emperoptera* also has these habits, living in company with the small and equally active Hemipteron, *Nesidiorchestes*, and other small insects, all flightless. The remark in the systematic portion of this work that it was taken '*on Freycinetia*' is incorrect and no doubt due to a wrong label having been attached to some of the specimens. It is altogether terrestrial. Several commonplace Dolichopodidae found in and around Honolulu are probably foreign (*Medeterus* sp.? &c.).

Pipunculidae.—About a dozen species of the genus *Pipunculus* are already known and probably numerous additional ones remain to be discovered. These species are difficult to discriminate being mostly closely allied to one another, and some of them apparently vary very greatly in size, perhaps in accordance with that of their host. Several, that have been bred, are all parasitic on Delplacid leaf-hoppers, chiefly those of the genus *Nesosydne*. The one species *P. rotundipennis* belongs to a different section of the genus from that, in which all the others are placed, and its host is not known.

Owing to the habits of the leaf-hoppers affected, most of the Hawaiian *Pipunculus* are to be found flying round ferns or forest trees and shrubs, since most of their hosts are to be found on these. They are never to be swept from grass, as is so often the case in other countries. At least two species attack the common hopper of the *Ipomoea* (*Nesosydne ipomoeicola*) and are found flying round Convolvulaceous plants, on which the host is so often found. Though all the species of *Pipunculus* are certainly endemic, yet two of them have attacked the introduced leaf-hopper of the sugar cane (*Perkinsiella saccharicida*) which is widely separated generically from the endemic hoppers. Most of the species of these flies are confined to the forests, but some stray below its limits and some above. Some are found in plenty, and individuals are to be seen constantly passing by on the wing, flying from plant to plant, the males in search of the females, the latter more carefully scrutinizing frond, leaf, or branch, in search of their hosts. Occasionally a pair are seen hovering in the air in copula, the larger male sustaining the female. As in other countries, the size of the fly, when bred, often appears very large as compared with the body of its host. So small a leaf-hopper as *Nesosydne raillardiae* will produce a comparatively large *Pipunculus*. The puparia, so far as is known, are always formed on or beneath the soil. They are never found exposed and attached to the surface of leaves as is the case elsewhere with certain (but probably few) species.

SYRPHIDAE.—This important family is quite unrepresented by endemic forms and the few introduced species, excepting perhaps *Xanthogramma grandicorne*, a common Australian insect, are of quite recent importation. *Volucella obesa*, *Eristalis punctulatus*, *Syritta oceanica* and *Eumerus marginatus* have all become established during the years of my residence in the islands and all are now very common insects. The *Volucella* was first seen in 1894, while the others appeared between 1897 and 1900. *Eristalis tenax* was already common in 1892. It thrives best at high elevations in the mountains. The *Xanthogramma* is a very beneficial insect, but is unfortunately much parasitized by the ubiquitous Ichneumonid, *Bassus laetatorius*, and sometimes by a species of *Pachyneuron*, unless this latter proves to be parasitic on the *Bassus*. The *Syritta* breeds in decaying vegetable matter, and has been reared from pots containing plants, the soil of which had been mixed with horse or cow droppings.

OESTRIDAE.—Represented only by three species, imported with domestic animals. These are *Oestrus ovis*, *Hypoderma bovis* and *H. nasalis*.

TACHINIDAE.—Represented by only three or four species, probably all foreign and most likely importations by man. A small unidentified littoral species might possibly prove to be endemic. *Frontina archippivora* is an extremely common fly, parasitizing *Anosia* and *Pyrameis cardui*, as well as the caterpillars of many moths of various families. It is of great economic value and is said to have been imported from America by Koebele. It is known to be of recent introduction. *Chaetogaedia monticola* is another very beneficial species, which attacks many of the most injurious caterpillars. Its habits have been studied by Swezey, and are of some interest, owing to the fact that it is one of those which deposit their eggs on the leaves of plants, instead of on a living caterpillar. It is of course largely a matter of chance whether the egg is swallowed by the latter, and hence the female fly is very prolific and the eggs minute. This *Chaetogaedia* may be a natural immigrant; at any rate it was universal throughout the mountain forests about 20 years ago. It would be interesting to compare a number of Hawaiian examples with N. American specimens, to make quite sure of their identity. It is a very favourite prey of the larger Hawaiian Crabronidae. Occasionally, like other parasites of caterpillars, it is itself parasitized by the imported *Chalcis obscurata,* though the latter is also normally a lepidopterous parasite. Like the Tachinids it may vary greatly in size according to the nature of its host.

SARCOPHAGIDAE.—The species of *Sarcophaga* are rather numerous and are all unquestionably importations from other countries, and their number has doubtless increased during recent years. Mr F. W. Terry, who has given much time to the study of the species for economic reasons, finds that the male genitalia afford excellent specific characters, but as these have been rarely described by systematists, the identification of the island species is almost impossible. *S. pallinervis,* one of the species described by Thomson from Honolulu, is identical with a North American one, while another is Chinese. *S. barbata* and *S. dux* are also common, but there are now other species present, so closely allied to the former that it is uncertain which of them is really Thomson's *barbata.*

These introduced *Sarcophaga* are now more or less attacked by Hymenopterous parasites, either casually or purposely imported, such as *Eucoila, Spalangia,* and several species of Pteromalidae, as well as Alysiidae.

S. pallinervis is the most ubiquitous of the island species, since the larvae live in the droppings of cattle, and it thrives at all elevations. It is greatly attacked by parasites, and is a favourite prey of the Crabronid wasps.

Apart from these foreign species of *Sarcophaga,* the family is represented by two endemic genera, of very great interest, and the most striking in appearance of any of the Hawaiian Diptera. These two genera are closely allied to one another and doubtless of the same origin, and it may even prove difficult, when all the species have been collected and studied, to maintain the generic distinctions between them. The blacker coloured species of the genus *Dyscritomyia* have in life a very Tachinid-like appearance and their behaviour in the field is also much like that of some of those parasites. The bright metallic green species of this genus and of *Prosthetochaeta* are in some cases more Lucilia-like.

As the development of these genera with their rather numerous and often highly remarkable species showed them, or rather their ancestors, to have been very ancient colonists of the islands, it became a natural question as to what their habits could be. Their Tachinid-like behaviour suggested that they might be parasites of Lepidopterous larvae, but the fact that they were not ever bred from these, though the latter were specially collected in a favourite locality for the flies, made this very uncertain. Excrement or carcases of mammals was out of the question from the absence of indigenous mammalia. So too with the birds, for the flies sometimes occur in dry, open, treeless localities, where are no birds. Many years of collecting had never revealed a large-sized fly maggot in decaying vegetation, not even in the most evil-smelling substances. Besides material of this sort is not found in the dry open country. These flies, so far as is known, are larviparous, the maggot, when born, being already of considerable size, so that there is some approach to the condition of the pupiparous flies. Some years ago Mr Terry reared one of these maggots to maturity on a mixed animal diet, including land molluscs. Later he obtained a new generation of flies from captured specimens kept in large glass jars and supplied with living and dead molluscs. Finally Mr D. B. Kuhns brought back Achatinellas (supposed to have been living when taken, but more probably recently dead) containing maggots, from which the flies were bred. Many shell collectors have noticed the occurrence of maggots in Achatinelline shells, found still fresh but not living, and we have ourselves sometimes picked up a number so affected in a single day. When one considers the great numbers of mollusca that exist in limited areas in the islands, it is certain that, even in a small area, many individuals must be dying each day of the year, quite sufficient to supply food enough to support the number of existing flies, especially as these when adult are very long-lived. Considering the well-known and very strong odour of dead land molluscs, these would not fail to readily attract creatures so keen-scented as Sarcophagous flies, probably long before the odour became appreciable to human senses. No doubt many kinds of molluscs serve as food for the maggots, for the flies are common enough in localities where only the thin-shelled *Succinea* is to be found. Species of this genus are to be found in very dry localities, and would account for the presence of the flies in such places.

The flies of both *Dyscritomyia* and *Prosthetochaeta* are difficult to determine specifically owing to the variability of individuals, the variation affecting important structures, e.g. the presence or absence of macrochaetae, which have been considered as of generic importance. Some of the species have very remarkable secondary sexual characters, and the male genitalia will evidently prove of great importance in the determination of the species. These flies are rarely found on the coast in dry districts or on the open forehills, but are common in open places in the forest, and occur also in dense forests, and are frequent above the limit of compact forest. Whether all are feeders on mollusca is of course at present uncertain. It is quite certain that they originally formed the exclusive prey of some of the endemic Crabronidae, and even now some of the latter have never been found to carry off any other kinds of fly. Some species of *Nesocrabro* may be often seen on the wing hunting beneath masses of fern or *Freycinetia* in damp shady places for these flies, which presumably are seeking there for fallen molluscs. All the larger species of Hawaiian Crabronids have at times been found carrying them off, and their burrows are frequently packed full of them to the exclusion of all other species. Certainly *Dyscritomyia* and *Prosthetochaeta* are amongst the most interesting constituents of the Hawaiian insect fauna.

Muscidae.—This family is not represented by endemic species, but owing to the ease with which species are transported with stores of meat or in other ways on steamers, there is now a considerable number of foreign representatives. *Musca flavinervis* was described by Thomson from Ross Island, with a variety from Honolulu, and is not known to us. There is known, however, in addition to *Musca domestica*, a very distinct Chinese species, probably of recent introduction.

There are several species of *Calliphora*, the date of their introduction being uncertain, but the conspicuous *Pycnosoma dux* became common in Honolulu in 1900, and was no doubt introduced a year or two previously. *Lucilia sericata* appeared about the same time as the preceding, and spread very rapidly, and as the maggots seriously infest living sheep, it sometimes does considerable damage. *Rhinia testacea* also appeared first in 1900, and at once became very common. *Haematobia serrata* was imported in 1896, and is probably a worse scourge to horses and cattle in these islands than elsewhere in the world. It breeds everywhere in the droppings of cattle, and brood follows brood throughout the year. *Musca domestica* is also bred freely from cowdung found in open pastures. *Stomoxys calcitrans* is a common pest, of earlier introduction, since it was noticed in numbers on Hawaii in 1892. The flies of the genera *Calliphora* and *Lucilia* are often carried off by the predatory Crabronidae; so too, occasionally, is the common house-fly. They are also subject to the attack of some of the same parasites as the Sarcophagidae.

Anthomyiidae.—The genera *Hydrotaea*, *Ophyra*, and *Homalomyia* contain only imported species, as do some others yet undetermined, but the several species of *Lispe* are clearly endemic, and no doubt others will be added to these. They mostly frequent the forest, and do not seem generally to be common. I have taken the fossorial wasps, *Hylocrabro tumidoventris* and *Xenocrabro molokaiensis*, carrying off one of the species. *Coenosia* is an important genus with more than twenty species known to me in the islands, but further collecting should increase this total to one hundred. No doubt many of the species are rare. Nearly all are true forest insects, and they are best represented in wet woods. Many of the species are known to be carnivorous, preying on other weaker insects. The larger ones may sometimes be seen in some numbers on the trunks of trees, having a bold appearance, as they stand ready to dart off after some other insect. Sometimes the larger seize and devour smaller species of the genus. Like so many other flies, they are themselves preyed upon by the Crabronid wasps, the cells of which are sometimes found packed with nothing but *Coenosia*. Both the black- and yellow-bodied species are taken by the wasps. Their earlier stages are not known, but it is likely that some of the larvae that are found in the *débris* at the bases of the leaves of *Astelia* or *Freycinetia* may produce these flies.

Sciomyzidae.—A single species of *Sciomyza* alone represents this family, and so far it has only occurred on Oahu. Very probably it will prove to have been introduced, though at present only known from the islands.

Ortalidae.—*Euxesta annonae* is a very abundant introduced species, and is often bred from sugar-cane that has been attacked by boring beetles, or which is in a state of decay. It may have been imported with some of the varieties of sugar-cane brought from America, though it might equally well have been introduced in other vegetable matter. *Acrosticta pallipes* was probably of more recent introduction, as it has become very much more numerous during the last 12 years than formerly. Like *Euxesta* it also has been bred from unhealthy stems of sugar-cane, etc. A species of *Chrysomyza* appeared first in 1900, and of late years has become very common.

Thus all the representatives of this family are without doubt foreign, though the *Acrosticta* was described from Hawaiian examples, and the *Chrysomyza* is as yet not identified with any described species.

Trypetidae.—Excluding *Dacus cucurbitae*, a very common oriental species, which had become numerous in Honolulu in 1900, having been introduced, no doubt, some years previously, the Trypetidae are represented by a number of endemic species of *Tephritis*, and an endemic genus *Phaeogramma*. *Dacus cucurbitae* was originally described as Hawaiian, and no remark was made as to its being an introduced insect, though this fact was known to all in the islands, if not to the describer. It is, like other fruit-flies, a very troublesome insect, attached chiefly to Cucurbitaceous plants, but also attacking beans, tomatoes, and other plants.

Though only three species of *Tephritis* are enumerated in this work, they will, no doubt, prove rather numerous, when the endemic Composite plants are thoroughly examined. *T. crassipes*, though very similar to some of the other species, may prove to have been really an early introduction by man. It is bred in great numbers from the foreign weed *Bidens pilosa*, as well as from *Cosmos* and other garden plants. *T. cratericola* attacks the Silver-sword (*Argyroxiphium*), in some cases every achene being destroyed by it. It is equally numerous on *Raillardia menziesii*. *R. laxiflora* yields another species of the fly, as does *Dubautia*. *T. cratericola* is noteworthy for the fact that there is a difference in the sexes in the dark pattern on the apical portion of the wing. *T. crassipes*, above mentioned, is attacked by two Hymenopterous parasites, no doubt introduced, one a species of *Eurytoma* (Chalcidoidea), the other a *Bracon* (Ichneumonoidea). At present these have not been bred from any forest-frequenting species of *Tephritis*, though both are very common around Honolulu. Nor has *T. cratericola*, which lives above the forest limit, been found parasitized. The *Bracon*, however, is now found on other of the islands, and these parasites, if they attack the true mountain forms of *Tephritis*, may diminish their numbers. New species of *Phaeogramma* also probably await discovery, their secretive habits causing them to be easily overlooked.

Sapromyzidae.—Of this family, only a single species of *Sapromyza* has been found, and that only in the immediate neighbourhood of Honolulu, rendering it highly probable that the species is introduced.

Piophilidae.—Represented only by the introduced *Piophila casei*, the produce of the cheese maggot.

Ephydridae.—Of the three genera enumerated, one, *Brachydeutera*, is represented by a single N. American species. The other two, *Notiphila* and *Scatella*, have each a species not yet known from outside the islands, but their claim to endemicity is uncertain. We suspect, however, that this family does contain endemic species.

Drosophilidae.—This family is a most important constituent of the Dipterous fauna, with nearly fifty species enumerated. They are very unevenly divided between three genera, *Hypenomyia* with one, *Idiomyia* with five, and *Drosophila* with the remaining species. The two former are endemic, and *Drosophila* is represented by an assemblage of species, exhibiting great diversity in structure and appearance, and will, doubtless, hereafter be found capable of division into other genera. At present these insects, many of which are obscure and minute forms, have been very imperfectly collected. To make an approximately complete collection and thorough study of the Hawaiian species would require the devotion of many years of special work. Not less than 250 species must exist in the islands, and double that number may very probably occur. Many of the species preserve very indifferently as dried specimens, and it is necessary that material should be preserved in alcohol as well as pinned. Those found in cool, wet forests often shrivel and distort, either soon after death, or when brought down into the hot and comparatively dry climate of the lowlands. Some of the species are quite conspicuous, and are readily attracted by the sap oozing from a broken limb of a tree, or from exudations caused by decay or disease. Very many breed in stems of trees or plants, which, when decaying, yield abundant moisture—such as those of the arborescent lobelias, of bananas, tree-ferns, etc. The larvae abound also beneath the bark of some forest-trees, which, when this is stripped off, reveal a semiliquid or pulp-like material covering the wood. Some of the larger and very many of the smallest and most obscure species live amongst the soft ferns, which grow in damp places beneath the shade of the forest-trees. The larvae of these flies are very subject to the attacks of Hymenopterous parasites, *Proctotrypes hawaiiensis*, and species of *Phaenopria* (Proctotrupoidea), several of the Eucoilinae (Cynipoidea) and *Spalangia lanaiensis* (Chalcidoidea) having been bred from them. The common Crabronid wasp, *Hylocrabro tumidoventris*, often fills its cells entirely with species of *Drosophila*, but the one which it most usually carries off is, I suspect, an introduced one.

Review of Hemiptera.

The Hawaiian Hemiptera present an interesting feature in the great difference between the constitution and development of the Heteropterous and Homopterous fauna.

Excluding the scale-insects (Coccidoidea) and the plant-lice (Aphidoidea), of which it is doubtful whether there is a single native representative, the total number of Hemipterous genera is 68, the species numbering 259[1]. Of these, 47 genera are Heteropterous, 21 Homopterous, while 126 species belong to the former, 133 to the latter division.

In the Heteroptera the following genera are represented only by species introduced through human agency: *Triatoma*, *Zelus*, *Alloeocranum*, *Clinocoris* (= *Cimex* and *Acanthia* Auct.), *Orthoea* (with two species, *O. nigriceps* and *O. vincta*), *Clerada*, *Rhopalus*, and *Geotomus*. *Triphleps* of the Anthocoridae and *Halticus* of the Capsidae are also certainly introductions, and one or two other Anthocorids and Capsids are also open to suspicion. The Pyrrhocorid, *Dysdercus peruvianus*, should be altogether expunged from the list, as, no doubt, having been brought forward on a wrongly labelled specimen. There was nothing like it in the Blackburnian collection, and I can only suggest *Ithamar hawaiiensis*, as the species, therein contained, which may have been supposed to be *Dysdercus*. Apart from these introduced species, the water-frequenting bugs *Arctocorisa blackburni*, *Buenoa pallipes*, *Merragata hebroides*, *Microvelia vagans*, and the pelagic *Halobates sericeus*, may be looked on as natural immigrants—the *Buenoa*, possibly an introduction by man—the three last-named being already known from other countries.

Excluding all the 15 genera and 16 species named, there remain to represent the Heteroptera 32 genera and 110 species. Twenty-one of these genera and all the species but one (the widely-ranging *Reduviolus capsiformis*) are at present supposed to be peculiar to the islands.

The indigenous fauna is made up of representatives of the following nine families only: ANTHOCORIDAE, MIRIDAE (CAPSIDAE), ACANTHIIDAE, MYODOCHIDAE (GEOCORIDAE), LYGAEIDAE, NABIDAE, REDUVIIDAE, THYREOCORIDAE and CIMICIDAE (PENTATOMIDAE). It must be remembered that of these the *Cimicidae*, *Thyreocoridae* and *Lygaeidae* are each represented by only one genus that can claim to belong naturally to the fauna, and that the total number of species is but four, so that these important families are almost unrepresented. The REDUVIIDAE have only a few species (in three genera) belonging to the *Ploiariinae*. The NABIDAE have a single genus with numerous species. On the other hand the CAPSIDAE (and in a less degree the ANTHOCORIDAE) are comparatively rich in genera, the former having no less than 14, but in these the total number of described species is only 24.

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[1] September, 1909.

The Nabid genus *Reduviolus* and the Geocorid genus *Nysius* contain no less than 50 of the 110 endemic Heteroptera, and both of these genera are cosmopolitan or nearly so. The average number of species to a genus in the endemic Heteroptera is only 3·4, the many genera of Capsidae and Anthocoridae with few species, being effective in the reduction.

If we analyze the Homopterous constituents of the Fauna and exclude the following species, introduced by man, viz. *Peregrinus maidis* and *Perkinsiella saccharicida* (Delphacidae), *Siphanta acuta* (Poecillopteridae), *Centrotypus* sp.? (Membracidae) and *Phrynomorphus hospes* (Tettigoniidae), there remain 16 genera with 128 species.

The Delphacidae contain seven endemic genera, which are evidently allied to one another, with 46 species in all, and one genus (not endemic) *Kelisia*, of independent origin, with only three described Hawaiian species. The Tettigoniidae have four genera represented, one of these, *Nesophrosyne*, and its offshoot, *Nesophryne*, containing 51 described species, while *Nesosteles* contains four species, one of which is certainly, and one probably, foreign. The Fulgoridae have two genera represented, one *Iolania* with a single variable species, the other *Oliarus* (cosmopolitan or nearly so) with 24. The Psyllidae have two genera with four described species, all endemic. Subtracting the two probably introduced *Nesosteles*, we have 126 Homoptera distributed in 16 genera and four families, an average of nearly eight species to the genus. Twelve of the 16 genera are endemic.

The contrast between the Homoptera and Heteroptera is therefore very great, and one might say that the former, having a much smaller stock of ancient immigrants to start with, has been far more successful in species-formation than the latter. Even making all allowance for corrections and for additions to the fauna, this fact will certainly remain true.

CIMICIDAE.—The Cimicidae are very poorly represented by the one genus *Oechalia*, of which the Hawaiian species are considered to be sub-generically distinct from the typical Australian form. The number of species existing in the islands cannot be considered as definitely settled at present. Two only are readily distinguishable, but others will probably prove to be distinct. *O. grisea*, as now considered, presents extreme variation in colour and structure, and of these varied forms it is likely that some are in reality good species, and may themselves prove to be less variable than *grisea*, as appears to be the case with the second species, *O. kaonohi*, lately described. At any rate the nymphs present noticeable differences, and, so far as my limited experience goes, similar nymphs have not produced adults varying in any very important manner. *Oechalia grisea* is one of the commonest Hawaiian bugs, and occurs even on the hottest and driest coasts, when the vegetation is green, and above the upper limits of the forest on the high mountains. It is, however, most abundant in the forest-belt, and eggs, nymphs, and adults may be found on all kinds of trees, as well as on ferns and low plants. It has even been found breeding in gardens in the town of Honolulu. Its chief food seems to be caterpillars, especially those of the genus *Scotorythra*, but those of a good many other groups are also attacked occasionally, e.g. *Plusia*, and various Pyralidina. During the excessive multiplication periodically of looper caterpillars, *Oechalia* sometimes becomes also excessively numerous, and we have then seen eggs, nymphs, and adults in countless numbers on the forest-trees. During the worst years of the attack of the leaf-hopper of the sugar-cane (*Perkinsiella*), in some localities, in cane-fields adjoining the forest, numbers of *Oechalia* were to be seen in all stages preying on the hoppers, and both species of the genus were present.

During a visit to Australia I only noticed occasional specimens of *Oechalia*, and do not know whether, though known to become very numerous, it ever occurs in such great numbers, as its Hawaiian congener, nor whether it exhibits the same structural variability. It is proper to say that in certain localities it is quite possible to collect a fair series of the Hawaiian species, that does not show much variation. Dark metallic green forms of *grisea* with blunt spines seem mostly to occur in wet localities at moderate elevations, and have been noticed especially in the West Maui Mountains and on Haleakala.

THYREOCORIDAE.—*Geotomus pygmaeus* is probably an introduced species, though it would be of some interest to compare its variation with that of specimens from other countries. It frequents open country, and is often found under stones, and thrives in dry, hot localities near the coast, as well as in open spaces in the high forest, in the regions where frosts occur. Nymphs are found in company with the adult at the roots of herbage or beneath rocks.

Coleotichus blackburniae is the sole representative of the Scutellerine group, and is by far the most showy member of the Heteropterous fauna. It is not known from elsewhere, but its congeners are conspicuous in Australia and the Moluccas. Apart from the fact that it is the finest Hawaiian bug it is interesting, in that it appears to have two forms, usually distinct at a glance, the one appearing red, the other yellow. It is very widely distributed, and is found in hot, dry localities near sea-level, and in the mountains to five or six thousand feet above the sea. I have bred specimens from nymphs found in a garden in Honolulu. Both adults and nymphs are frequently gregarious, lying packed close together, when at rest. Great numbers are sometimes in consequence found together, and a single tree may hold some hundreds of specimens of adults and nymphs of all sizes, as well as many eggs. The adults appear to be on the wing at night, and occasionally enter houses, attracted by the light. However, they take flight very readily on slight disturbance in the daytime, especially during hot sunshine, usually flying a short distance, and making a loud humming noise as they fly.

Sometimes after a short circular flight they return to the tree from which they were disturbed. They are very partial to Koa trees (*Acacia koa*), but feed, so far as I have observed, only upon the pods of these, extracting their juices. Whether they will attack other parts in the absence of pods is very doubtful. They breed likewise very freely on a very different tree, *Dodonaea viscosa*, and both eggs and nymphs are occasionally found on other plants. The two mentioned trees are, however, their favourite food-plants. They have also been found breeding on imported Acacias. Usually from *Dodonaea viscosa* I have obtained the yellow form, with clear yellow dorsal stripe, untinged with red, from *Acacia koa* the red form. Whether these varieties depend entirely on the food-plant is, however, uncertain; it is perhaps more likely due to climate, the yellow variety being chiefly found in the driest localities. It is a remarkable fact that the little Lycaenid butterfly, *Lycaena blackburni*, which holds a position in the Hawaiian Lepidopterous fauna somewhat analogous to that of *Oechalia* in the Heteropterous, feeds either in the pods of *Acacia koa*, or on the *Dodonaea* with equal readiness and, so far as is known, on no other native trees. The small, globular nymphs of the first stage are very conspicuous objects from the strong contrast of their colours, the abdomen being for the most part bright red.

LYGAEIDAE.—If some doubt is attached to the endemicity of *Coleotichus*, this is also the case with *Ithamar hawaiiensis*, which likewise is only known from the islands. It abounds on the coasts of some of these, especially frequenting species of *Sida*, is common on the lower edge of the forests in open shrubby places, at 1500 to 3000 ft. above the sea, and again in open places in still higher forest, and far above this to a height of 9000 ft. At higher elevations it breeds on *Cyathodes*. Apparently it exhibits no noteworthy variation in any of these stations. Nymphs in all stages, eggs, and adults are found together on the plants named. The adults frequently wander elsewhere in their flight, and I have taken them in my garden in Honolulu. The hairy nymphs undergo conspicuous changes in the course of their development. This is probably the species that Blackburn supposed might be *Dysdercus peruvianus*. The only other Lygaeid represented in the islands—*Rhopalus hyalinus*—is certainly an introduction. Though common in Honolulu it was not obtained by Blackburn thirty years ago. It is polyphagous, and its eggs and young are familiar objects on the plants of *Sonchus*. The eggs are parasitized by two species of Proctotrupoids, *Telenomus rhopali* and *T. paractias*.

MYODOCHIDAE.—With this family we come to an extensive and important part of the Heteropterous fauna. The genus *Metrarga* with its two sub-genera is peculiar to the islands, so far as is known, and, moreover, forms an endemic sub-family. The number of species is at present uncertain, as those belonging to the typical sub-genus are apparently very closely allied. Excepting in size there does not seem to be much variation. In four species of the genus (sensu lat.) the variation in size is quite marked, by the occurrence of unusually small examples. These are taken actually in company with the larger examples. In *M. contracta* an interesting variety occurs in which the hind part of the pronotum is very conspicuously pale, so that superficially it greatly resembles typical *M. nuda.* It is apparently of rare occurrence, four in more than 50 examples of the normal form, all taken in company, were observed on one occasion. *Metrarga villosa* has the wings reduced to such microscopic rudiments as to be practically apterous, though the tegmina extend to the tip of the body. The other species are well winged.

The winged species are often notably gregarious, a dozen to scores congregating together at the base of the leaves of a single plant of *Freycinetia.* The nymphs occur in the same situation, sometimes mixed with the adults. These winged species may also be found on the ground amongst dead leaves or fragments of fern fronds, while the flightless *M. villosa* seems to have taken entirely to a terrestrial life, and perhaps became flightless in accordance with these habits. It is remarkable that amongst large flocks of one of the winged species (e.g. *contracta*) one or two examples of another species (*nuda*) are sometimes found, so that the flocks are mixed. The odour of the species is disgusting, when a colony is disturbed, and taints the surrounding air. While the representatives of *M. nuda* that are found on Hawaii, Oahu, and Maui are very similar, it is noteworthy that the Molokai form, although of precisely similar habits, is more distinct in appearance superficially.

The two species of *Orthoea* are of small interest, both having been certainly introduced; one of them, *O. nigriceps*, was already abundant more than thirty years ago, the other, *O. vincta*, appeared in 1900, and is already one of the commonest of Oahuan Hemiptera, and has now extended its range to the mountains. The latter is attached to the common foreign grass, *Cynodon dactylon*, amongst which nymphs in all stages abound amongst the adults. In the youngest nymphs the femoral armature is little or not at all developed. Brachypterous specimens occur in company with the macropterous. I have found nymphs of this or an allied genus, when inspecting plants imported from Fiji.

Clerada apicicornis is a semi-domestic species, living and breeding freely in dirty houses and cupboards, where cockroaches are allowed to multiply. It also occurs in outhouses frequented by bed-bugs. On the other hand it can adapt itself to diverse conditions, and I have noticed adults and nymphs in numbers in dry sandy localities, living with various common cockroaches, especially *Periplaneta*, *Euthyrrhapha*, etc., beneath dead leaves. Curiously enough in the mountains it frequents the bases of the leaves of *Freycinetia*, like *Metrarga*, and was once found by me in company with these. *Sephora criniger* is a local but common forest insect, found on various trees, while *Nesocymus calvus* lives on sedges, nymphs and adults occurring together, often in great numbers. The latter may prove to be not endemic, though it is now widely distributed in the mountains, and is found on Hawaii as high as 4000 ft. above the sea, in open places in the forest amongst low sedges. Brachypterous forms do not seem to occur. *Nesomartis psammophila* frequents sandy places, on or near the coast, living on low grass, or on the ground beneath, with its nymphs. In the larger of these the head is not produced far beyond the sides of the pronotum, as in the adult, but is of ordinary form. The youngest nymphs are remarkable for their shining black head and thorax, with white mediodorsal line. The species will probably be found elsewhere, and prove to be a natural immigrant.

The species of the genus *Nysius* form a large and important part of the Hawaiian Heteroptera, and no doubt many remain to be discovered, the disgusting odour that they emit rendering them unpleasant objects to collect. Some of the species occur in vast numbers. A small tree will sometimes furnish a home for hundreds of individuals, adult and nymphal, of *N. saundersi*, and others are equally common. It is not clear to what extent the different species are attached to particular plants. Some, which I had supposed to be confined to a single species of tree, I have on another occasion found in numbers on a totally different plant, belonging to some family far removed from the other. Some seem habitually to frequent for choice the dead or decaying branches of the tree they inhabit, others the flowers, and many the leaves or any other part. Many frequent low plants or ferns. No doubt there are numerous species that are very closely allied one to another, and as there is manifestly very great variation in the individuals of some of the species, a thorough knowledge of the genus in the islands will require prolonged study. It is likely that the actual differences between mere variations of some species will prove to be apparently much greater than the true specific differences between the most nearly related, but really distinct, species. The variable *N. blackburni* was noticed at Kilauea, Hawaii, feeding in little groups of several together on the droppings of mynah birds. These birds at the time were feeding on the fruit of an imported raspberry. Some species are at times met with living gregariously at the base of the leaves of *Freycinetia* like the *Metrargae*. The Hawaiian series exhibit great differences in important characters in their extreme forms. It is possible that one or two may have been imported with foreign plants.

Merragata hebroides, found on ponds near Honolulu and elsewhere, occurs also high up in the mountains of the other islands, and is known also on the American continent, being apodemic.

NABIDAE.—Represented in the islands by a large number of species of the genus *Reduviolus*, one of which, *R. innotatus*[1] White, I am told by Mr Kirkaldy, is apodemic and widely distributed. The other species form two groups, each of which contains numerous closely allied forms, but the connection between these two groups is not obvious. *Reduviolus oscillans* is typical of the first of these groups, and *R. lusciosus* of the second, the latter with its allies forming the sub-genus *Nesotyphlias* of Kirkaldy. *R. oscillans* and its near allies are all macropterous and exhibit little or no individual variation in the development of wings and tegmina and the ocelli are perfectly formed. In *Nesotyphlias* on the other hand the wings are reduced to extremely minute lobes, the tegmina are hard and leathery, with the membrane always reduced, and the various forms exhibit very great specific differences in the amount to which the tegmina are shortened. The wings do not, so far as I have been able to examine the species, vary in size in accordance with the difference in the size of the tegmina. Thus *Nesotyphlias lusciosus* with its tegmina forming a perfect abdominal covering, and with much larger membrane, has the same small, almost microscopic wings, as such a species as *N. curtipennis*, the tegmina of which fall far short of the apex of the abdomen.

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[1] Since identified as *R. capsiformis*.

There is, however, one species of Hawaiian *Reduviolus*, and that one of the commonest and most widely distributed of all, which differs from all the others, in having brachypterous and macropterous forms, as well as somewhat intermediate conditions. It was described, no doubt from macropterous examples, by White, as *R. blackburni*, there being no brachypterous specimens in Blackburn's collection. Blackburn's specimens were such as are usually found in drier localities or at lower elevations; truly brachypterous forms inhabit wetter localities or higher elevations in the mountains. I have taken some pains to observe this species at high elevations above 4000 ft. in the mountains, where I have seen it breeding in numbers amongst low sedges. In the most brachypterous form the membrane is much reduced in the female, the tegmina not quite covering the abdomen, while the wings are much shorter, though extending somewhat beyond the middle of the abdomen. It will be seen, therefore, that although the tegmina have suffered a reduction fully as great as in typical *Nesotyphlias lusciosus*, the condition of the wings is entirely dissimilar, nor have the ocelli suffered any apparent degradation. There is therefore a very great gap between *Nesotyphlias* and the forms of *R. blackburni*, which form as it were a faint lead to the condition of this always flightless sub-genus. In one other respect, in which *Nesotyphlias* differs greatly from the fully-winged Hawaiian *Reduvioli*, *R. blackburni* does make an approach to the former. Most of the winged forms have the pronotum much widened posteriorly and this widened part, when seen in profile, is considerably raised above the anterior portion. In *Nesotyphlias* this condition is exactly reversed, the front part of the pronotum being convex and raised above the posterior part. *R. blackburni* in its macropterous form is one of the few Hawaiian species, in which the hind part of the pronotum is but little raised posteriorly, the profile of anterior and posterior parts being about on the same level. In the brachypterous specimens the condition of the pronotum is variable, but in many of these it is distinctly convex anteriorly, and posteriorly is sunk to a lower level, in the same manner as in *Nesotyphlias*. It should be noted that the external copulatory organs of *R. blackburni* are notably different from those of the other *Reduvioli*, whether of the fully-winged group or of the flightless *Nesotyphlias*. It is quite possible that new species will be discovered connecting the well-winged forms of *Reduviolus* more closely with the flightless *Nesotyphlias*, and such a discovery would be of considerable interest.

As in so many other Hawaiian genera containing many species, *Reduviolus* presents a series of forms mostly very closely allied and sometimes more or less difficult to discriminate; some, indeed, without minute and careful study in the field it will be impossible to fix as being certainly good species or only variations. Amongst these occur a few forms, notably distinct and separable at a glance, though manifestly allied to the others. Many of the species exhibit considerable variability not only in colour, but in such characters as the shape of the pronotum, the thickness of the basal joint of the antennae, etc. Such variations occur in individuals of a species taken in company. It is noteworthy that whereas *R. blackburni* varies in the condition of tegmina and wings, being apparently affected by temperature or humidity or both combined, other species, such as *R. oscillans*, which are found under conditions, as diverse, seem to be nowise affected by these conditions.

The variety of *R. kerasphoros* with flavescent tegmina on the basal part is interesting, as nearly reproducing the colour pattern, that is, so far as we know, fixed as a specific character in *R. sharpianus*.

On Oahu I have made some attempt to study the habits of two forms of the flightless *Nesotyphlias*, which are very similar, with a view to deciding on their distinctness as species. On the whole their habits seemed to confirm their distinctness, seeing that though both might be found under apparently the same conditions, the one would also thrive in situations never occupied by the other. Thus though to some extent alike in habits, in others they differed, and this partial difference in habits was always accompanied by a definite difference in structure.

The habits of the Hawaiian *Reduvioli* are of considerable interest, for whereas some apparently have their habitat solely on one kind of tree or plant, others are less particular in this regard. It is noteworthy that the species, that are attached to a single kind of plant, are invariably of very distinctive superficial appearance. In determining the true habitat of a *Reduviolus* attention should be paid only to the trees or plants affected by the nymphs, because in the fully-winged forms, which fly sufficiently well, though weakly, individuals occur casually on plants, with which they have no real connection. *R. kahavalu* attached to *Sophora chrysophylla*, *R. tarai* on *Cyathodes*, and *R. truculentus* on *Pipturus* are good examples of the restricted habitat. The *Reduvioli* being carnivorous, it might be supposed that the restricted habitat of the species just mentioned (and of others to which I have not paid special attention in the field, in order to observe them *in situ* on their favourite plant) was due to the fact that these special plants furnished a special prey. This I believe not to be the case, but the association is rather for concealment, since either in the nymph or adult or in all stages these bugs of restricted habitat most closely resemble parts of the plants on which they are found.

Others that have not so special a habitat, yet often occur in their greatest numbers in situations, which best serve to conceal them. I have observed scores of *R. oscillans*, in all stages, on dead or dying fern fronds with which their colours harmonized very well.

The flightless species of the sub-genus *Nesotyphlias*, are much more terrestrial in their habitats than the others, some in fact, so far as is known, live entirely on the ground. They ascend ferns especially, on occasion, but are not at all arboreal as the fully-winged group are.

The nymphs of *Reduviolus* are not as a rule of particular interest; the basal antennal joint, which usually becomes much more slender in the adult, than it was in the nymph, in *R. kerasphoros* increases in thickness in the adult, in which also the processes of the head become much larger than in the penultimate stage. In young nymphs these curious horns are absent.

The Hawaiian *Reduvioli* prey upon small and weak insects and we have never seen them attack Coleoptera, as the introduced *Zelus* does. It is probable that the comparative feebleness of their mouth parts would render this impossible. They are commonly found on such plants, as are the home of small Delphacid leaf-hoppers, on which they are well known to feed, while some of them eat also the honey-dew or sweet excretion that is produced by the hoppers. They have been seen sucking the juices of Psocids and it is probable that these form an important article of diet of several species. The imported leaf-hopper (*Perkinsiella*) which did so much damage in the cane-fields, was attacked to some extent both by *R. capsiformis* and *R. blackburni*, both becoming common in some of the affected fields.

The eggs of *R. capsiformis* are destroyed by the Mymarid parasite, *Polynema reduvioli*. In 1902 leaves of melon plants, very badly attacked by an *Aphis*, were sent to me for inspection, and on these were many nymphs and adults of *R. capsiformis*, preying on the plant-lice. The eggs of the *Reduviolus*, however, had become very highly parasitized by the *Polynema*, very few young bugs appearing. Embedded in the leaves of grasses and of the sugar-cane eggs from which parasites have escaped are found not infrequently. Probably the eggs of species of the terrestrial, flightless sub-genus *Nesotyphlias* will likewise, when discovered, be found to yield a Mymarid parasite, for a large *Polynema* is constantly observed flying over the earth, in the damp dark haunts of these insects. Further it is possible that these parasites are a strong check on the multiplication of Hawaiian *Reduvioli* in general.

Gerridae.—A family of small importance represented by two genera, each with a single species, one of which, *Halobates sericeus*, is of very wide distribution, and has been seen on the sea round various parts of the coast of several of the islands, and no doubt occurs round all. I have seen *Halobates* in great numbers, when I have been sailing round the coast of Hawaii near Kawaihae, but never had an opportunity of collecting specimens.

Microvelia vagans is an abundant species and widely distributed in the islands, from the coast to high mountain elevations. It frequents both stagnant pools and running water, often in great numbers, and after heavy rains is sometimes seen even on the temporary puddles in the roads round Honolulu. It flies by night and occasionally is attracted by lights. Possibly it will be found elsewhere and is a natural immigrant, though it may have been of early introduction in the water supply of sailing vessels. It exhibits considerable variability in colour, but this has not been specially investigated in reference to different localities.

REDUVIIDAE.—This family is represented by endemic species of the Ploiiariianae and three imported species of other groups, none of the latter being found in Mr Blackburn's collection. One, indeed, *Zelus renardii*, was introduced about 1897, when I observed one or two specimens, including a female by the side of its egg-mass, at Honolulu in the Government Nursery, where plants were introduced and raised by the Board of Agriculture for general distribution. By 1900 it had become fairly common in Honolulu, and three years later extremely so, and had spread to all the other islands. It preys on very different kinds of insects, and the adults will destroy many kinds of beetles, such as Dermestids, Coccinellids and Tenebrionids, and even the hard Hymenopterous genus *Chalcis*. The young feed on softer creatures, especially *Aphis*, young leaf-hoppers, etc., which are also attacked by the mature bugs. Although destroying an occasional lady-bird, when well-grown, yet the main food of *Zelus*, as an adult, consists of injurious insects or at least of such as are not beneficial, while the young prey almost entirely on injurious species. Consequently, on the whole, *Zelus* does far more good than harm.

Triatoma rubrofasciata has several times been found in houses or outhouses infested with cockroaches or bed-bugs. *Alloeocranum biannulipes* has only occurred once. The endemic genus *Nesidiolestes* is said to be allied to *Luteva* and *Ploiariodes*, the other two Ploiariine genera represented. The species are terrestrial and have been found in company with the flightless *Reduviolus*. *Luteva* and *Ploiariodes* prey on Psocidae; a species of the former is occasionally found in houses in Honolulu. The number of species of the latter is at present uncertain; they are usually found on dead branches of trees, to which the dry leaves are still attached, and on dead fern fronds, whereon their prey is numerous.

ANTHOCORIDAE.—This family is represented by a small number of species scattered in half-a-dozen genera and although these species are all, at present, known only from the islands, it is uncertain whether several of them are not really introductions, their small size, and unattractive appearance rendering them liable to be overlooked in tropical countries, or at least neglected by the collector. Three of the species occur in gardens in Honolulu and two of these are widely distributed outside, but they cannot be looked on as forest insects. All three are found in the cane-fields. These are *Triphleps persequens*, *Physopleurella mundula*, and *Buchananiella sodalis*. The first-named will I think almost certainly prove to be foreign. It is partial to flowers, e.g. those of *Lantana camara* and preys on the Thysanoptera (introduced) that are found in these. *P. mundula* and *B. sodalis* are sometimes found in company, the former being especially common, sometimes occurring in countless numbers, as in the cane-fields at Paauhau in 1903, hiding amongst the dead cane-leaves, where it preyed largely on Psocidae and small leaf-hoppers. On the leaves of growing trees or shrubs, such as crotons, oranges, mulberries, etc., the conspicuous red nymphs and mature bugs are often found beneath the webs made by the Psocidae, which feed on the black fungous growth, that springs up on the excretions of various scale insects infesting these trees. One may find at such times a small flock of Psocids resting side by side with their enemy, beneath the covering made by the former. Both *P. mundula* and *B. sodalis* may be found in decayed stems of plants, where, I believe, they feed on Thysanoptera, which are found in this situation. Yet another small Anthocorid, at present undetermined, has the same habits, and this also was present in the islands at least thirty years ago. *P. mundula* exhibits considerable variability or I would rather say that, until careful examination has been made, I do not feel sure that there is not more than one species of its genus.

Lasiochilus denigratus and its allies are true forest insects and live beneath bark or in the cavities of dead twigs or stems, the nymphs being found in the same situations. The specific characters appear to be feeble and uncertain.

Lilia dilecta is also a forest insect and the genus is endemic. I have not met with it, or at least neglected to collect it. I regret that I neglected to collect specimens of one or more forest-dwelling Anthocorids, distinct from any of these.

MIRIDAE.—The Miridae, better known to entomologists in general as Capsidae, are represented by a greater variety of endemic forms than any other family of Hawaiian Heteroptera. Eleven of the genera are endemic. Two recorded species are certainly recent introductions, an undetermined species of *Fulvius* (I believe the same species as one I met with while inspecting introduced plants) and *Halticus chrysolepis*, abundant in Honolulu gardens, where macropterous and brachypterous forms occur together, the latter having mere rudiments of wings. Even so late as the early part of 1909 single specimens representing two other genera of Capsidae, have been found in Honolulu. These imported species are of very little interest, but their occurrence renders it likely that one or two other Hawaiian species, not known from elsewhere, may have been imported with plants at an earlier period. At the most three, however, are open to suspicion. *Oronomiris hawaiiensis*, a very abundant species on foreign grasses, occurs everywhere in suitable places, from the coast to 5000 ft. or more on the higher mountains. This will, I think, almost certainly be found outside the islands, though possibly a natural immigrant. *Hyalopeplus pellucidus*, so common in the gardens in Honolulu, a doubtfully endemic species, is also ubiquitous in suitable localities, and is chiefly attached either to foreign plants, or at least to such as are not endemic, but it is polyphagous. In Honolulu it is mostly found on the hedges of imported *Hibiscus*; on the lower slopes it breeds, often in profusion, on the imported guava; in the high mountains, at four thousand feet and upwards, it is no less common in all stages on *Dodonaea viscosa*, a native tree or shrub, that is apodemic. Whether in general the species of *Hyalopeplus* are variable I am ignorant, but *H. pellucidus* exhibits notable variations of a melanochroic character. These appear to be mostly found in wet localities or at high elevations, where specimens for the most part smoky black are found, in some cases at any rate mixed with those of ordinary colour and intermediates. Like *Oronomiris*, the genus *Opuna* was formed for a small and obscure Hawaiian insect. It is attached to a species of *Sida* that is not endemic, and it will probably be found elsewhere. *Sulamita* is an endemic genus, and forms an endemic division or tribe of the Miridae, several very closely allied species being known. They frequent the endemic forest trees (of various kinds) from 2000—5000 ft. The species of *Tichorhinus* (*Orthotylus*) are numerous, and of universal occurrence throughout the mountain forests of all the islands, and certainly many, and probably all the species are numerous on occasion. They are, however, very frequently extremely unevenly distributed in some forests, so that, while one or more trees of a certain kind may contain many, sometimes in fact hundreds of specimens of a species, other trees of the same kind in the neighbourhood will produce few or none.

Some of the species are polyphagous and found on very different trees, and can thrive, moreover, at very different altitudes. Thus *T. iolani* may be found on an endemic *Hibiscus* on the dry forehills, in some of the wettest low-lying valleys on other native trees, as well as on an apodemic *Hibiscus*, or yet again above 4000 ft. on the high mountains on other endemic trees. Such extreme cases are, however, exceptional, and some species are, so far as we know, quite constant to a single kind of tree. Thus one of the smallest species, of green and black colour (allied to *T. kanakanus*), is one of the commonest insects that are attached to *Pipturus albidus* in the mountains round Honolulu. Another minute red species, lives on *Cyathodes* on the high mountains of Hawaii, in company with the several other Rhynchotal insects, that habitually frequent that plant.

Some of the species exhibit much variability in colour, and as the structural characters (unless the male genitalia should prove to be of value) appear in general to show very slight specific distinctions, it is not always easy to define the limits of the species. A general variability is exhibited by individuals taken in company, and moreover there is evidently local variability as well. Though small, some of the species are really pretty insects. The nymphs are often abundant on the under side of the leaves of the trees, in company with the adults. Unless disturbed by shaking, very rarely are any of the latter seen on the wing.

Koanoa, with one recognized species only, is almost universally distributed in the forests of all the islands. It appears not so much to frequent leaves as the woody parts of trees and is often taken on dead branches, when one is collecting beetles. *Kamehameha lunalilo*, a species exhibiting some variability, is chiefly to be found in damp forests, living on the mosses or creeping ferns, which clothe the trunks and branches in such situations. Consequently it may be obtained from many kinds of trees by indiscriminate beating of the branches.

The *Cyrtopeltis* (*C. hawaiiensis*) was obtained from a shrub or tree, not noted at the time, but probably *Dodonaea*, at a high elevation, 8000 ft. or more, on Haleakala. An apparently allied form is very common in the mountains round Honolulu, living, in all stages, beneath the leaves of *Gouldia*.

The small flightless *Nesidiorchestes*, in which the wings are absent, is terrestrial, living chiefly in damp shady places, where the soil is more or less covered with decaying leaves. Sometimes it is seen in numbers in company with the flightless Nitidulid beetle, *Apetinus explanatus*, and the flightless Dolichopodid fly, *Emperoptera*, and young of the flightless crickets (*Paratrigonidium*), which it slightly resembles in appearance.

Pseudoclerada morai is a remarkable insect, exhibiting conspicuous variation. Some of these varieties, however, may prove to be closely allied species. There is great sexual difference in the development of the eyes, and brachypterous forms occur. The species inhabits damp shady places in the forest and has been found beneath bark of dead branches of trees, and also amongst the moss or creeping ferns growing on these. Like *Metrarga*, they hide at the bases of the leaves of *Freycinetia*, where rubbish accumulates. They may possibly prove to be predaceous.

In the genus *Sarona* there are a number of forms, the extremes differing greatly in size and colour, but apparently showing little or no distinction in superficial structure. In most localities on Oahu they are rare, but in parts of Hawaii occur in great numbers, frequenting the leaves of various forest trees. On one occasion I examined a large number of specimens from *Metrosiderus*, and found great variability in size and colour, while close by on a species of *Raillardia* were many specimens, small, black, and hardly at all variable either in size or in colour. On Oahu, near Honolulu, they are to be found on *Pelea*, and I think these Oahuan specimens do not vary much, nor do they visit the trees of *Metrosiderus*, in the neighbourhood of the *Pelea*. Unless new characters for specific distinction are discovered, the number of species that exist will, I expect, remain very uncertain. The largely developed hooks of the male genitalia may prove of use for distinguishing the species.

Kalania hawaiiensis is allied to the preceding and resembles it in habits, and in fact occurs with it on the island of Lanai. Though recorded only from that island, it may not improbably be found on Molokai or Maui or on both of these islands.

ACANTHIIDAE.—There are two distinct forms of *Acanthia*, and each of these exhibits striking variation, or it may be that there are several closely allied species related to each of these two forms. However that may be, there is certainly great variation in individuals of a single species in superficial appearance. The diversity of habits shown by these Hawaiian species is of considerable interest. Both frequent the margins of mountain streams, but are found quite away from these, running on the ground in damp shady places, in thick forest. They are also at home in damp rocky places in open parts of the mountains. On one occasion on Hawaii, when climbing a tree to collect certain species of beetles, I found two or three specimens of *Acanthia* running on the trunks, high above the ground, a habit, as Kirkaldy informed me, quite unique. Curiously enough two of these arboreal individuals, taken together, had no superficial resemblance to one another, though, I think, clearly of one species, nor do they differ from examples found running over a wet, rocky cattle trail on Molokai, where the insect showed similar variation. It is a remarkable fact that while in some localities a number of individuals of *Acanthia* may be taken together and show no great variation, in others, individuals will occur, which differ very greatly amongst themselves. Nymphs are often met with in the same localities as the adults, sometimes in greater numbers than these, from which they differ greatly in head and thorax, the former with the eyes being only about as wide as the front margin of the latter and closely adapted to this. Both *A. exulans* and *A. oahuensis* are flightless, the wings of the former being much smaller and shorter than the tegmina and reaching about to the middle of the abdomen. Those of *A. oahuensis* are still further reduced, and there is evident variation in examples from different localities, which may possibly be specific.

CORIXIDAE.—This family is represented only by *Corixa blackburni* White, a species not known from elsewhere. It is very widely distributed on the lowlands of the islands, inhabiting salt-water pools as well as ponds of fresh water. It comes to light at night sometimes in considerable numbers.

NOTONECTIDAE.—Represented only by *Buenoa pallipes*, a foreign species. It is equally abundant near sea-level and in ponds on the mountains at an elevation of at least 3000 ft., being generally distributed.

Hemiptera-Homoptera.

The Hemiptera-Homoptera of the Fulgoroid and Jassoid superfamilies are no doubt more numerous in species than the Heteroptera, owing to the fact that several of the genera have evolved great numbers of allied species, of highly specialized habits, in so far that they are restricted, many of them, to a single food-plant, and can only live in those stations, where these special food-plants flourish. Moreover on different islands, even when living on a similar food-plant, the species may be quite different. In the present state of our knowledge we can say that the vast majority of the known species have so far been obtained only from one kind of plant, but that a few are able to live on quite different kinds of trees. Nearly all are attached either to trees or shrubs or to various species of ferns, and the fauna contrasts most strongly with others, where there is usually such a varied assembly of forms frequenting grasses, sedges, etc.

It is interesting to compare the components of these Homopterous groups with those given already in the Heteroptera, excluding in each case such forms as are either known to be foreign or are likely to prove so. Only *Nysius*, *Reduviolus* (s.l.) and *Orthotylus* can be compared with the more extensive genera of the Fulgoroids and Jassoids as successful producers of species, and only a few of the *Nysius* and a few species of Capsids, as equally successful producers of individuals.

Poekillopteridae.—A single species representing this family, *Siphanta acuta*, is of recent introduction, having appeared first about 15 years ago. It is a common Australian insect. By 1900 it had become so extremely numerous, that in some of the forests on Oahu it was actually destroying large numbers of certain native trees, besides being injurious to coffee and other cultivated plants. A Proctotrupoid egg-parasite (*Aphanomerus pusillus*), introduced by Koebele and myself in 1904, has done excellent service in many localities in diminishing the numbers of this pest. In wet districts it frequently is destroyed by a parasitic fungus.

Fulgoridae.—This family is represented by only two genera, and one of these, *Iolania*, which is endemic, contains but a single species. It is very variable in markings and intensity of colour, and is partial to ferns, on the trunks of which it may be frequently seen resting.

The other genus, *Oliarus*, contains a score of species, some of which are quite conspicuous and striking insects amongst their congeners. Many of the species are variable in colour and markings, considerable variability being exhibited by examples of a species taken in the same locality, and there is evidently further variation due to different local influences. In addition to general variation, there is in many species striking sexual dichromatism, so that the one sex of a species may sometimes bear a greater superficial resemblance to another species than it does to its own partner.

Consequently the separation of the numerous species is attended with considerable difficulty, very few apparently being notably distinct from their nearest congeners.

Some of the smallest and most obscure forms are strictly attached (e.g. *O. kaonohi*) to tree ferns, in the cavities of the stems of which, especially when they are fallen and more or less decayed, the nymphs are found living gregariously. Most of the finer species, however, are attached to various forest trees, and of some of these the nymphs live beneath the bark, sometimes in large flocks, sometimes associated with the adults. In such situations the amount of honeydew excreted, not being exposed to sun or wind, accumulates in extraordinary amount. Apparently several of the species are entirely restricted to one kind of tree (e.g. *O. tamehameha* on *Metrosiderus*) but the observations on this point are not conclusive, since they have not been made in sufficient numbers, nor in sufficiently numerous localities. Of these more conspicuous arboreal forms the apparent scarcity of many is, doubtless, more apparent than real, for we have observed some of these in considerable numbers on the trunks or stouter branches of the smaller-sized forest trees, on which they run with considerable quickness, and with the rapid sidling movements of the larger Fulgorids of other countries. In such circumstances they do not readily admit of capture, and if the branches be jarred, the majority of the individuals no doubt escape, their strong jump combined with flight carrying them beyond the limits of any receptacle held beneath. Though of universal occurrence, where native insects are found, they will probably be found most richly represented in wetter forests, with very heavy rainfall. One species at least, a small and prettily marked one, lives on a liliaceous plant (*Astelia*), growing in abundance around the volcano house at Kilauea on Hawaii.

Asiracidae.—Excluding two or three genera, the species of which are either certainly introduced or possibly natural immigrants, the six endemic genera of Asiracid (often known as Delphacid) leaf-hoppers form a remarkable assemblage of allied forms, notable for the similarity of structure in the jumping spur of the tibiae. There is little doubt, I think, that they have originated from the same ancestral immigrant, the generic divisions of the present-day assemblage having proceeded on lines quite similar to those followed by other genera of Fulgoroids in other parts of the world. At the same time the genera are very well marked indeed, as defined by Kirkaldy, though I anticipate that forms connecting some of these more closely, remain to be discovered. In this connection it is interesting to note that in the mountains close to Honolulu there occurs (at present undescribed) a form in which, though quite similar in general characters to other Hawaiian species, the frontal keels remain separate and well defined for half their length, in this respect being intermediate between *Aloha* and *Nesorestias* on the one hand and the remaining endemic genera on the other.

There appears to be no material difference in habits between the representatives of the different genera, considered collectively. After spending considerable time in observing Asiracid hoppers in Australia and England, as well as in the islands, one is struck with the difference in habits between the endemic Hawaiian genera and the others. A good many of the former are certainly attached solely to ferns, and so are some of the latter, but so far as is known, grasses, which elsewhere usually produce these insects in abundance, in the islands have not yielded a single species of the endemic genera. Apart from those frequenting ferns, nearly all are attached to various endemic trees, while one or two live on low-growing dicotyledinous flowering plants. *Aloha ipomoeae* is an interesting species, in that, although it follows the plants of *Ipomoea* into the forest region, it is also a true littoral species, frequenting the *Ipomoea pes-caprae* on sandy beaches. I think it highly probable that this species or others very closely allied thereto will be found on this widespread plant in other countries.

Many and probably most of the species of endemic Asiracid leaf-hoppers are attached to a single species of plant, while others affect very different species of the same genus of plant, as for instance *Aloha ipomoeae*, and *Nesosydne ipomoeicola* on various kinds of *Ipomoea*. On the other hand, even on the same island, two allied species may frequent the same or very closely allied plants in the same or very closely adjoining neighbourhoods, as two species of *Nesodryas* on *Gouldia* in the mountains just behind Honolulu. One of these moreover is found on more than one species of *Gouldia*. *Nesosydne gouldiae* has been found not only on *Gouldia*, but on a very different endemic genus of trees, breeding thereon. It is necessary to observe that in assigning hoppers to a particular plant one must consider only those on which they really breed, for adults of the winged species may be found on plants with which they have no real connection. When some nine years ago I first collected the small *Nesodryas freycinetiae*, it was noticed in numbers resting on a foreign weed on the lower edge of a forest near Honolulu and I suspected it of being a foreign insect. In reality these specimens had been beaten down by a violent storm, that occurred in the previous night, from plants of *Freycinetia* overhead, for on these alone are the nymphs found feeding.

Although many of the species of these leaf-hoppers occur in large numbers when found, yet they are often very irregularly distributed. In many cases scores of a species of plant may be examined and yield no hoppers, and then one will come upon one or several adjoining, on which there is a profusion of specimens. Some species are no doubt particular as to the condition of the tree they affect, as is the case with *Nesosydne koae*. The true leaves of *Acacia koa* are replaced by phyllodes and in most cases only the latter are found on well grown trees. Some, however, will yearly produce true leaves in abundance, and on such *Nesosydne koae* thrives in extraordinary numbers year after year, when it has become established. Surrounding trees, that bear phyllodes only, will rarely produce a few stragglers of the hoppers. Large phyllode-bearing Koa trees, which have an occasional young shoot bearing true leaves, will often have quite a colony of the *Nesosydne* confined to these shoots. One or two of the species are widely distributed over the islands, and at present it would be premature to consider that the many, known only from one island, are really confined to one, though no doubt this will prove to be the case in many instances. Nor is it probable that the genus [1]*Nesodryas*, consisting of small insignificant species, is really confined to Oahu.

As in other parts of the world, these Asiracid leaf-hoppers differ much as to the development of the wings according to the species. *Nesodryas* in all its species is fully winged. In *Nesosydne* some species are known, in which fully winged examples occur, but these are much rarer than the flightless individuals. I have certainly examined many thousands of the common *N. ipomoeicola* in search of parasites, both in the mountains and in the lowlands, where were colonies within a few yards of my house for several years, but fully winged individuals were rarely met with. For several consecutive days I examined for the same purpose great numbers of *N. raillardiae*, but I never found any but flightless forms. Still they may be produced at irregular intervals. *Nesosydne koae* and some others are only known as fully winged individuals, though the species named occurs in profusion.

In the genus *Aloha* the conditions are very similar to those in *Nesosydne*. In *A. ipomoeae* fully winged forms are rare as in *Nesosydne ipomoeicola*, though this species also has been examined in equal numbers for parasites. *A. lehuae* and its allies are always fully winged, but of *Nesopleias nimbata* it is unlikely that winged forms are ever produced, since the very short tegmina have become thickened and the neuration more reduced than in brachypterous *A. ipomoeae*. It would appear probable that in the various endemic genera, species, which we know from a fair number of examples of fully winged individuals, are not likely to yield brachypterous ones under any circumstances, while the normally brachypterous species sometimes produce fully winged individuals in small numbers, but more often are entirely brachypterous. We know no Hawaiian Asiracid, in which both winged and flightless forms are more or less equally common, no such case in fact as is presented by the two introduced forms *Perkinsiella saccharicida* and *Peregrinus maidis*. In the former of these winged examples are always common, and flightless females abound in the colder months of the year. In the latter both forms in both sexes abound at various seasons. *Nesorestias* contains a single species with very short tegmina, and is not likely to yield a winged form, the peculiar structure and texture of the tegmina being analogous with that of flightless Hawaiian Hemerobiids in the Neuroptera.

In the Hawaiian Asiracids it should be observed that, whether fully winged or flightless, both sexes agree in this. No species are known, which, like the introduced *Perkinsiella*, produce brachypterous individuals in one sex only. In the flightless Hawaiian forms the wings are reduced to microscopic rudiments, but can be seen in all the species that I have examined. There appears to be little difference between the largest nymphs of some of these flightless species and the same stage of fully winged ones, the tegminal and alar lobes being almost equally developed in each, so that in the species which produce both winged and flightless forms it would appear that the development continues equally in the nymphs of either to the penultimate instar, when in the one case a fully developed wing forms within the wing pad (on which some neuration is visible) while in the other case the wing is reduced to the rudimentary condition of the adult. The nymphs do not appear to be particularly interesting in general, the chief point of interest being the presence of two facial carinae in those which produce adults with only one.

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[1] More than one species of this genus is now known from Kauai.

Kirkaldy tells us that the only Asiracid known outside the islands, having a tibial spur similar to that of the Hawaiian endemic genera, is the arboreal *Proterosydne* of Australia.

The genus *Dictyophorodelphax*, discovered by Mr O. H. Swezey, is remarkable for the great prolongation of the head, a common feature in other groups of Homoptera, but not known previously in Delphacids. It is clearly an offshoot from the more normal Hawaiian forms.

Many of the species of the native genera exhibit a wide variability of colour, and further frequently the sexes are differently coloured. The males, however, are so easily separated by the great differences in the genitalia, that in the discrimination of the species this is of small moment. Whether there may be different species with similar genitalia is yet unknown, but it is not improbable that such will prove to be the case, when species from all the islands have been more thoroughly collected. The flightless forms are no doubt not easily spread from one locality to another, and I suspect that in many of these a good deal of local variation may be met with. I once examined two large series of *Nesosydne pipturi* from two different stations in the mountains behind Honolulu, where the species is very common. The first lot were taken from a number of trees, growing near together, in a rather open spot, the second lot from an isolated tree distant not many hundreds of yards from the former. Although possibly individuals might have been picked from each lot agreeing exactly, yet on the whole the two series were so distinct superficially, that until I examined the genitalia I had great doubts whether those from the isolated tree were not a really distinct species.

The eggs of some of the species are known to be destroyed by Mymarid parasites of the genus *Polynema* and nymphs and adults of very many have been found infested by the Strepsipteron, *Elenchus melanias*. In the mountains of all the islands many species are parasitized by a somewhat aberrant species of *Pseudogonatopus* (Dryinidae), this parasite attacking species of *Nesosydne*, *Aloha* and probably other genera. On the lowlands *Aloha ipomoeae* is attacked by *Echthrodelphax fairchildii*, another Dryinid, which likewise parasitizes the small *Kelisia sporobolicola*. This leaf-hopper is common on the coasts, feeding on the foreign grass *Sporobolus virginicus*, and two other species of *Kelisia* have also been found. Wherever these leaf-hoppers are found in the forests, and sometimes in the open country, one or more species of the parasitic flies of the genus *Pipunculus* will be found, sometimes numerously. I have bred two species from mixed colonies of *Aloha ipomoeae* and *Nesosydne ipomoeicola* and another from *N. raillardiae.* At Kilauea I observed many of these flies around a *Pipturus* tree, growing in a shady place, and infested by another *Nesosydne*, as well as about ferns affected by other species.

MEMBRACIDAE.—Represented only by a species of *Centrotypus*, of recent introduction. It was first taken in the Nuuanu valley in 1903, since which time it has occurred occasionally and will no doubt become common.

TETIGONIIDAE.—This family is represented by a large number of species, closely allied to one another, but forming two genera, one being, so far as is known, peculiar to Kauai, and at present containing few species. Excepting that *Nesophryne* (the small genus) sometimes occurs on ferns, all the endemic Hawaiian Tetigoniidae (of the extensive genus *Nesophrosyne*) are attached to flowering dicotyledinous plants, and the vast majority of the species frequent the various endemic forest trees. A few kinds only are attached to low growing plants, and one of these, *N. perkinsi*, is of some interest, as living on a foreign (but naturally immigrant) species of *Sida*, on or near the coast. The case of *N. perkinsi* as regards habits and food-plant and its relation to its forest-frequenting congeners is in several respects similar to that of *Aloha ipomoeae* in the Asiracid series.

It is quite certain that a large number of the species of *Nesophrosyne* are restricted to a single food-plant, and more than one species may occur on the same individual tree.

The separation of the species is at present attended with much difficulty, for many of them are very variable in superficial appearance and there is often a considerable difference in the colour or pattern of the sexes. It further seems to be of rather common occurrence, in the case of such species as present these sexual differences, for individuals of the female sex to assume more or less completely the colour of the male, a phenomenon which is also apparent in some of the Asiracid Fulgoroids. In addition to this, a colony of a species infesting one tree sometimes shows considerable differences in appearance, when compared with a colony infesting another tree, even though the distance between the two is small, and these differences are likely to be increased, when colonies from more isolated spots are examined. I have little doubt that any number of superficially distinct forms could be obtained by selective breeding. It is possible that the appearance of individual colonies is often due to the nature of the original parents that colonized the tree, for colonies, if undisturbed, persist on a single tree, as I have experienced, for years.

Many of the species are certainly common, in fact in some localities, e.g. on the uplands of Hawaii some of them occur in extraordinary profusion, hundreds or thousands having been noticed on a single tree.

Although the adults present apparently very feeble characters for specific separation, yet the nymphs by their bristles and ornamentation are often more easily distinguished. Consequently one may breed from nymphs of the most distinctive appearance adult hoppers that greatly resemble one another.

The superficially distinct species *N. ponapona* and *N. pipturi* are sometimes found on the selfsame tree of *Pipturus*, a very remarkable case, unless they be dimorphic forms of a single species.

The species of *Nesophrosyne* are subject to the attacks of a parasitic fungus, which, on the uplands of Hawaii, we have found, at times, to amount to a severe epidemic. On one occasion countless thousands of one or more species were to be seen sticking on the leaves of the trees, all dead, those in which the development of the fungus had not proceeded far, being still life-like in appearance. The eggs of these Tettigoniids are extensively parasitized by the Mymarid genus *Polynema*, but neither Dryinid nor Pipunculid[1] have been obtained from nymph or adult, in striking contrast with what occurs in other countries.

The other known members of the Jassoid group are of comparatively little interest, though *Limotettix* is, I think, certainly represented by truly endemic species. A species of *Conosanus* (*C. hospes*) extremely common in gardens in Honolulu is certainly introduced and of no interest. Its introduction is quite recent.

CHERMIDAE.—Better known as Psyllidae, these insects are represented by rather numerous species, in fact the gall growths formed by *Trioza* on the predominant tree (*Metrosiderus*) of the Hawaiian forests are one of the most familiar entomological sights in the islands, while others on various species of *Pelea* are sufficiently common. Although these gall-forming species are so numerous in individuals, a number of species of *Hevaheva* with picturated tegmina occur much more rarely and locally, though no doubt the species are rather numerous. If they produce gall-growths, these have not yet been discovered.

APHIDAE.—The members of this family are of little or no interest faunistically, since probably all of them have been imported with introduced plants. In this connection however it is proper to state that formerly, 1892–1896, a species of *Myzus* (?) was very abundant throughout the mountains, especially attacking the species of *Pelea*, other species of Aphids being hardly met with in the forests at the earlier date. This *Pelea*-frequenting species seems to have been practically exterminated by the ladybirds (especially *Coelophora inaequalis*) introduced to diminish the attacks of foreign Aphids, on which *Coelophora* now maintains itself in the mountains.

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[1] *P. rotundipennis* belonging to a different section of the genus from that including the other known species, may be parasitic on Tettigoniids.

Coccidae and Aleurodidae.—These families are of no importance in the present connection, probably all the many species of the former and certainly all the few representatives of the latter having been introduced with plants.

Review of Thysanoptera.

The Hawaiian Thysanoptera have so far only been collected casually, and of late years many introduced forms have become conspicuous around Honolulu and elsewhere.

So far as I can judge, the endemic fauna is entirely restricted to the Tubulifera and all the Terebrantia will prove to have been imported by man. Even of the former we may suspect that *Agnostochthona*, *Diceratothrips*, and possibly *Trichothrips* are represented only by foreign species, while *Anthothrips usitatus* is certainly an importation. This leaves us with only four genera, all peculiar to the islands, which at present must be considered as truly native. Three of the four genera, *Dermothrips*, *Oedemothrips* and *Nesothrips*, contain only a single species, while the other, *Dolerothrips*, has nine, and is evidently dominant in the islands. I believe that all the native species are attached to dead wood, flower-frequenting species being absent. All the specimens obtained by me were found whilst I was collecting beetles, and no special search for Thysanoptera was made. Individuals of some species are quite numerous, and they seem to occur everywhere in the mountain forests.

Review of Orthoptera.

At the present time the Hawaiian Orthoptera are represented by 83 species, 38 or 39 of which are certainly endemic, while 44 or 45 are apodemic and have mostly, no doubt, been introduced by man's agency.

The Phasmoidea are entirely absent from the fauna, while the Mantoidea are represented by two species of recent introduction and the Acridioidea by two foreign species, one of quite recent importation (1900) and one established here many years ago. These three great groups were therefore quite wanting in the fauna under natural conditions, though two of them now are represented by common foreign species brought accidentally with plants since the colonization of the islands by white men.

Hardly better represented are the Dermaptera, Forficuloidea or Earwigs and the Blattoidea or Cockroaches. Though there are seventeen species of the latter, now known as Hawaiian, one only has any claim to be considered endemic, a true forest insect, *Phyllodromia obtusata*. It is just possible that one or two other species are natural immigrants, but I think this unlikely.

The Earwigs are in nearly similar case, for while a few may be natural immigrants, we know that three or four species have become introduced within quite recent years. One, however, listed in this work as *Anisolabis pacifica*, will I think prove to be a distinct species and endemic or at least a natural immigrant.

Forficuloidea.—Of the genus *Anisolabes*, *A. annulipes* is the most abundant and ubiquitous, being found at all elevations from sea-level to four or five thousand feet in the mountains. [1]*A. maritima* is less abundant, but is very widely distributed and sometimes very common beneath stones in damp localities in the forest region. It also occurs near sea-level. [1]*A. littorea* is much rarer than either of the above. We have noticed it on the margin of salt-water ponds on the coast and it has been recorded from a considerable elevation (2000 ft.) in the mountains. The species recorded as [2]*A. pacifica*, but which will probably prove to be endemic, has been found only on Kauai, where it lives beneath logs or stones in or near the forest region. It was in company with the young of this species that *Japyx sharpi* was found, at an elevation of 4000 ft. *A. annulipes* and *A. maritima* are cosmopolitan species; *A. littorea* is a well-known New Zealand insect.

Labia pygidiata is a very common insect in the forests of all the islands, where it lives beneath bark, especially that of damp and decaying trees. Other species of this genus are of quite recent introduction and found on more than one island. Some of these are known to inhabit Samoa and Fiji, having been found on plants imported from those islands. *L. pygidiata* is reported from Java and Burma and is, no doubt, of wide distribution.

A fine *Labidura* (probably *icterica* Serv.) is now common on Oahu, under stones in damp places, and beneath trash in the cane-fields. Like many other foreign forms it was probably introduced with growing plants from the Oriental region, where it is widely distributed. It is spreading to other islands of the Hawaiian group.

Chelisoches morio is a very common insect, especially in the *Freycinetia*-growing belt of forest. It generally lives at the bases of the leaves of that plant and of such others as retain moisture, where they clasp the stem. It abounds in such situations on *Canna indica*, *Cordyline terminalis*, and in damp localities on the sugar-cane. Though many lie concealed during the day, others may be noticed running over the leaves of the plants they frequent at all hours. They are largely carnivorous, but also feed on vegetable matter, such as the red inflorescence of the *Freycinetia*. We have observed them devouring caterpillars and the sugar-cane leaf-hopper. They often seize and hold their prey in their forceps. *C. morio* is of very wide distribution, ranging from India to the Philippines and through many of the Pacific islands. Most probably it was a natural immigrant or it may have been originally introduced by the natives from other island groups of the Pacific. It was particularly noticed by the naturalists of British expeditions in the early part of last century. We have in recent years found it abundantly, in company with *Sphingolabis hawaiiensis*, in consignments of plants brought from Fiji, so that it is easily transported by these means. The latter species,

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[1] Other species, *A. aporonoma*, *eteronoma*, have been described on examples, no doubt similar to those here alluded to as foreign species.

[2] Since described as *A. perkinsi* (Burr. Tr. Ent. Soc. Lond. 1910, p. 178).

S. hawaiiensis, has much the habits of *Chelisoches* and in fact is often found in company with it. Both species, in wet localities, are found nearly to sea-level.

MANTOIDEA.—The common Australian Mantid, *Orthodera prasina*, was, doubtless, introduced with orange trees from Australia, and was first noticed on the island of Kauai, about the year 1896. It is thoroughly naturalized there, but apparently does not spread rapidly and is still confined to that island. It has been noticed preying on that most beneficial ladybird *Coelophora inaequalis*, as well as various other insects.

The larger *Tenodera sinensis* is a more recent introduction from the Orient and was first noticed in some numbers in Hamakua district of Hawaii about the year 1900. It has spread to some extent over that island, but has not yet been reported from other islands of the group.

BLATTOIDEA.—The numerous introduced cockroaches are a conspicuous element in the fauna, many of them (*Periplaneta australasiae* and *americana*, *Stylopyga decorata*, *Euthyrrapha pacifica*, etc.) thriving both as domestic pests and out of doors in the open. Some, e.g. *Phyllodromia hospes* and *Loboptera extranea*, are of recent introduction, having first become noticeable towards the end of the last century, though now excessively numerous in individuals and widely spread. The females of the former are brachypterous and flightless. The *Loboptera* has been found in consignments of Fijian plants in recent years and may have been imported from that group. The common *P. germanica* remains practically a household insect, and abounds on steamers which call at Honolulu. *P. hieroglyphica* is one of the commonest of cockroaches at low and medium elevations. *Oniscosoma pallida*, taken by Mr Blackburn 30 years ago, has not since been met with. *Leucophaea surinamensis* is an exceedingly common species, the young of which are often found in great numbers under stones, and are remarkable for the appearance of the hind parts of the body, which resemble those of wood-lice, so that when the fore parts are buried in the soil they might on superficial examination be mistaken for those Isopods. *Eleutheroda dytiscoides*, another excessively numerous species, is injurious to trees, gnawing the bark from the branches of *Casuarina*, *Citrus*, etc. The young and adults often congregate in masses amongst the foliage, falling to the ground when disturbed, and scuttling off with irregular gait to conceal themselves. This species is viviparous. The pretty species of *Euthyrrapha* (*E. pacifica*) breeds in neglected cupboards amongst rubbish in houses, and also abundantly beneath dead leaves, etc., in the open, but only at low elevations. The nymphs are uniformly dull and ugly creatures, very different from the really handsome adult. A second species of this genus, or an allied form, has been more recently found in numbers on Hawaii.

Very different in habits from any of these is the endemic *Phyllodromia*, *P. obtusata*. It is a most abundant insect throughout most parts of the forests of all the islands, where it lives beneath bark of trees, in clusters of dead leaves, or in living foliage, where the leaves have a tendency to curl up and form a suitable place for concealment. It exhibits much variety in the development of the wings so that in some localities all the individuals exhibit so strong a tendency to become brachypterous, that they might almost be considered as forming a distinct species. The varieties of this species seem to be connected with special localities.

Both the endemic species and many of the foreign ones are subject to the attack of parasites. The Encyrtid *Solindenia picticornis* is bred from the capsules not only of *Phyllodromia obtusata*, but from those of other cockroaches, and parasitized oöthecae are often met with. The two *Evania*, of which one has not hitherto been found in other countries, are extremely numerous on the lowlands and in the lower forest, while these are themselves destroyed by the Tetrastichine Eulophid, *Tetrastichus hagenowii*. Some of the native birds are partial to the endemic *Phyllodromia*, and the introduced mongoose sometimes devours numbers of the two large *Periplaneta*. It is unfortunate that the injurious *Eleutheroda* is, from the nature of its life-history, exempt from the attacks of Hymenopterous parasites.

ACRIDIOIDEA.—The common Oriental grasshopper *Oxya velox*, confined in 1892 to Oahu and Kauai, has not yet been reported from other of the islands. It thrives in wet or moderately wet localities, in fact particularly where one finds the introduced Hilo grass (*Paspalum conjugatum*).

Atractomorpha crenaticeps appeared in Honolulu in 1900, and several years elapsed before it became really common. The original examples met with were of the brown form, but green-coloured specimens were found soon afterwards. No doubt this grasshopper was imported with plants from Australia, where we have found it commonly, or from Hong Kong, whence we have seen examples collected by Mr F. Terry. It can live in much drier localities than those frequented by *Oxya*.

LOCUSTOIDEA.—This great group is represented by five genera only, and of these three are introduced forms. *Elimaea punctifera* Walk. (*appendiculata* Br.) was of early introduction, being common during the period of Mr Blackburn's collecting. It is a widely distributed Oriental species and is now thoroughly established on all the islands, but is confined to the lowlands and lower forest regions. The flattened eggs are inserted in the fronds of ferns and leaves of various plants causing a slight swelling on the epidermis. They are much parasitized by the Encyrtid Eupelmine *Anastatus koebelei*, and a minute *Trichogramma* or *Pentarthron*, the latter issuing in large numbers from a single egg. The former parasite, which is a common garden insect and found in the forest also, was not met with by Mr Blackburn and was therefore probably introduced at a later period than its host.

Holochlora venosa is no doubt a later importation from the Orient. The eggs are laid in numbers in long slits made in young shoots of the 'Avocado pear' (*Persea*) and of other trees, and arranged in regular rows in these slits. They were observed numerously as early as 1895 or perhaps earlier, but the adult insect, which is comparatively rarely met with, was not found till a much later period. Probably the eggs will prove to be much parasitized by the *Anastatus* above mentioned. Eggs of apparently the same cricket have been found in shoots of young plants brought from Hong Kong and Japan. The other imported Locustid, *Xiphidium varipenne* Swezey (=*X. fuscum* huj. op. II. 14), was a very rare and local insect in 1892, and by no means numerous in 1897, but by 1900 had become one of the most abundant of insects and spread all over the group. Probably it will prove to be an introduction from the western parts of N. America. It is to a very large extent carnivorous, devouring Homopterous insects and caterpillars. It is a delicate feeder on vegetable matter, preferring the stamens and other tender parts of flowers. The eggs are laid in a row beneath the leaf-sheath of Hilo grass, sugar-cane, *Canna*, etc., and are frequently destroyed by an Aphelinine parasite (*Paraphelinus xiphidii*) of abnormal habits, of which about a dozen examples may emerge from a single egg. For some years after its appearance no short-winged forms of the *Xiphidium* were noticed, but subsequently they became abundant. In the driest and hottest localities the short-winged forms appear to be absent or nearly so during the hottest months of the year, but appear numerously at other times.

Swezey has investigated the percentage of long-winged and short-winged forms in various localities and in various months of the year. Intermediate forms are very rare, usually about 2 per cent., where the proportion of winged and flightless examples is about 83 per cent. and 15 per cent.; whether the greater percentage consist of the long-winged or short-winged forms the percentage of intermediate forms remains much the same.

The other Locustidae are endemic and are represented by a single *Conocephaloides* (*C. remotus* Walk. = *C. hawaiiensis* huj. op.), while eight or nine species belong to the endemic genus *Banza* (*Brachymetopa* huj. op.). The former seems now to be very rare, but was probably once abundant, and has been destroyed by introduced predaceous insects. It is interesting, as being a form such as one might suppose gave rise to the more remarkable *Banza*. All the species of *Banza* (except that possibly *B. molokaiensis* and *B. mauiensis* may prove to be synonymous) are each one restricted to a single island of the group, and all those species, of which a number of examples have been collected, are dimorphic, having green and brown forms. The most remarkable case of this dimorphism is exhibited by *B. parvula* W. (*discolor* Redt.), where the whole appearance of the insect is changed owing to the coal-black face of the *discolor* var. and the pale face of the *blackburni* form. Further reference to this species will be found in Vol. II. p. 689 of this work. Briefly it may be said that in the localities, where it has been specially studied, the males of *B. parvula* are brown, black-faced insects, with green pale-faced forms occurring rarely, while the females are pale-faced green insects with black-faced brown coloured individuals occurring still more rarely than do the green males. It is interesting to notice that whereas in this species the common form of male is brown and the female green, in all other species collected in numbers both sexes are usually of the green form. In *B. nitida* var. *punae*, when brown (or at least not green) varieties occur they are, I think, always of the female sex, while in *B. parvula* the *discolor* form is nearly always of the male sex. *B. nitida*, when molested, exhibits a curious posture, threatening and protective, shown on pl. I, fig. 3*b*, Vol. II., but I cannot recall having noticed this behaviour in any other species.

The species of *Banza* are entirely nocturnal in their activities, resting by day on their food-plants, and are usually very well concealed. They are not at all restricted in their habitat, for the same species may be found on very numerous trees or plants, e.g. *B. parvula* W. (=*discolor* huj. op.) is common on *Cordyline*, various ferns, *Acacia koa*, *Metrosiderus*, *Pelea*, *Straussia*, *Freycinetia*, etc. They are, however, particularly partial to *Cordyline*, *Freycinetia*, and such plants as have the leaves closely embracing the stem, thereby affording more perfect concealment, while frequently they hide amongst masses of dead leaves, when a branch of a tree has died and the leaves remain adherent to form a thick shelter. The young are also very numerous on soft ferns and frequently conceal themselves beneath the leaves of *Pelea*, which curl up around the edges and form a good hiding place. The eggs are found arranged in a row at the bases of leaves of *Cordyline* and *Freycinetia*, but they must certainly occur also on ferns, *Canna* and other plants affected by the young. The latter in *B. parvula* Walk. are more varied in colour than the adults, being green, testaceous, various shades of brown, brownish crimson, etc., but the adults produced from these are extremely uniform in comparison, being either true *discolor* form or true *blackburni*. The latter rarely produces a variety of facial coloration, which to some extent may be looked on as exhibiting partial characters of the *discolor* form. The males stridulate freely at night, but it is difficult to locate the sound. The eggs are parasitized by a species of *Eupelmus* of the Chalcids, and perhaps also by the Proctotrypids of the genus *Anteris*. Some of the species of *Banza* seem to be extremely scarce, and I suspect that a great many eggs are destroyed by parasites. Occasionally on Hawaii we have taken examples that have clearly been seized by birds, but have escaped with mutilation, It is interesting to notice that *B. nitida punae* sometimes saves its life by the loss of one or both of the hind tibiae, which are perpendicularly elevated in its attitude of defence.

GRYLLOIDEA.—Here belong the greater part of the species which form the endemic Orthopterous fauna, for of nearly forty described species only five have been accidentally introduced. These introduced forms are of very little interest.

Gryllus innotabilis is one of the commonest of insects, but is not a forest insect, being abundant on the lowlands and lower mountain elevations. We have found living specimens in consignments of growing plants sent from other countries, showing thereby that it continues to be brought here by commerce. Sometimes this cricket forms a large part of the food of the mongoose. A second species of *Gryllus* appeared in the islands in 1900 and is now at times extremely common on Oahu. *Gryllodes poeyi* is abundant in many places, and is often found beneath rocks in extremely dry situations. It also is a lowland, or at least not a forest insect. The imported mole-cricket (*Gryllotalpa africana*) is, so far as is known, still confined to the island of Oahu and has acquired an unpleasant notoriety, as being decidedly injurious. The injury done by this insect is of two kinds. Burrowing in the banks of ditches etc. it allows the water, used for irrigation purposes in cane- and rice-fields, to escape, and also, locally, seriously injures the stems of growing sugar-cane, where they lie on the ground, by driving large borings or tunnels through these. It is excessively numerous in suitable localities, and on hot dark nights, during the prevalence of southerly winds, is occasionally attracted in countless numbers to the lights of lighthouses and other less powerful lights.

The little myrmecophilous cricket is common on Oahu in the nests of various foreign ants, such as *Pleidole megacephala*, *Solenopsis geminata* and more than one species of *Prenolepis*. In migrations of some of these ants we have observed these crickets marching in line with their hosts. We have also found them in nests of ants brought in consignments of growing plants from foreign countries, when examining such consignments on the wharf in Honolulu.

The endemic Grylloids belong to two different groups, the Trigonididae, represented only by the genus *Paratrigonidium*, and an endemic family or tribe Prognathogryllidae, in no way related to the former, and containing several distinct genera. The Hawaiian species of *Paratrigonidium* are remarkable for the fact that while they severally often exhibit very great distinctness in habits, in structure and appearance they often so closely resemble one another as to be only separable with great difficulty and by very slight characters. All are true forest insects. *P. pacificum*, commonest and most ubiquitous of all the species, is chiefly terrestrial in habits. Though occasionally it ascends ferns, bananas, etc., it is mostly found actually on the ground in damp places and moves about actively by day in the deep shade. Many of the other species are strictly nocturnal, living in concealment and remaining silent by day, whereas *P. pacificum* sings the whole day through, as well as at night. *P. grande* and *P. attenuatum* are commonly found beneath bark of trees, often in mixed assemblages of young and old together. *P. saltator* and *freycinetiae* live only at the bases of the leaves of *Freycinetia*, *P. roseum*, *subroseum* and *atroferrugineum* only amongst the leaves of *Metrosiderus*; the latter, indeed, has only been found on one special variety of this tree! *P. filicum* and *viridescens* are found on ferns, each frequenting different kinds, and so not mixing together. In general, the young of the species that frequent foliage are green, however differently coloured the adults may be, whereas those that live on the ground or beneath bark of trees, have brownish or obscurely coloured young. The terrestrial *P. pacificum* is perhaps the most variable, as it is also the most numerous, and it is the most isolated structurally. In wet places the pronotum of this species is often quite white from a dense growth of fungus on that part, but this growth seems in no way to injure the insect. The arboreal species are a good deal hunted by the endemic birds, which seek them beneath the bark, as well as on the foliage. That most local of Drepanid birds, *Viridonia sagittirostris*, was almost always found to contain abundant remains of *P. freycinetiae*, which it procures from the base of the leaves of *Freycinetia*. The terrestrial *P. pacificum* is the least powerful in jumping, the saltatory powers of the arboreal species, when adult, being really prodigious for their size. It may be supposed that since these so often lose the protective colour of their nymphs, they find sufficient protection in their powers of leaping, when they have reached maturity. At any rate the sudden change from a green insect to a black and orange one, as seen in *P. atroferrugineum*, is quite remarkable. All the species, as adults, are quite wingless, the tegmina alone remaining as stridulating organs. Until the last ecdysis, wings and tegmina develop *pari passu*, but at that ecdysis the tegmina undergo much further special development, while the wing-rudiments, instead of proceeding with their development, entirely abort. It is not known whether these crickets are subject to insect parasites, but it is possible that the eggs will be found to be attacked either by the Mymarid, *Polynema*, or the Proctotrypid, *Anteris*. Not very infrequently they are found to be infested by a parasitic worm (*Gordius*) which emerges from the thorax or abdomen, and is still more frequently seen at large on fronds of ferns or on other low plants that grow in the damp shady places most affected by these little crickets.

The rest of the endemic Grylloids form the most interesting part of the orthopterous fauna. There are nearly a score of species known and they are distributed in four genera, closely related to one another, forming together a natural group. Two of the genera are represented by only a single species, and these are clearly offshoots from each one of the larger genera.

Nesogryllus, once characterized as distinct, has now long been known to us as the male of *Prognathogryllus*, originally founded on the female sex only. The species of *Prognathogryllus* have well developed tegmina in the ♂, adapted for stridulating, but both sexes are flightless, the wings being rudimentary.

In *Leptogryllus* and its offshoot *Thaumatogryllus*, the wings are absent and in some species the tegmina are so minute as to be only visible at the extreme sides of the mesonotum, while in others they cover the whole (or almost the whole) metanotum, this being the maximum of their development in the genus. *Aphonogryllus* is very imperfectly known and may be only an immature stage of some species of *Prognathogryllus*. If not, it is clearly a derivative from the latter genus.

All the species of Prognathogryllidae are entirely nocturnal and we have several times found them at night running on the trunks of trees. In the daytime some of them conceal themselves beneath bark, or in holes in decayed wood, while others inhabit the pith cavities of certain forest trees. *Prognathogryllus stridulans*, once a difficult insect to obtain in the mountains round Honolulu, has now become common, owing to the unhealthy state of many of the arborescent lobelias in this locality, as elsewhere in the islands. At the present time and in fact for the last ten years many of these trees have lost their former healthy condition, and are now either entirely dead or have many dead branches. These dead branches being hollow afford a most convenient home for *Prognathogryllus*, and rarely is a tree found in this condition which does not harbour the cricket in some or all stages. In former years it was most difficult to find a tree in the dead and dry condition suited for these crickets, and they were then more often obtained by splitting dead twigs and branches of *Pipturus*, an urticaceous tree. The males of *Prognathogryllus* stridulate only at night, after they have emerged from their retreats. The species of *Leptogryllus* have rather varied habits which, however, are not altogether constant in the case of a single species. Several (*L. elongatus*, *kauaiensis* e.g.) have been found numerously, hiding in dead hanging fronds of tree-ferns, or (*L. fusconotatus*, *elongatus*, *nigrolineatus*) amongst dead masses of banana leaves still adherent to the plant, beneath bark of trees (*L. simillimus*), or under moss or creeping ferns (*L. forficularis*). Another favourite hiding place for several species is at the base of the leaves of *Freycinetia*, where we have found *L. nigrolineatus*, *L. similis*, *L. fusconotatus* and other species. These crickets are sought after both by some of the Drepanid birds and also by the Meliphagine 'Oo' of Kauai. Adults and nymphal forms are usually found in company. Some of the *Leptogrylli* feign death, lying with the body somewhat crescentically curved. No parasites of those crickets are yet known, but it is quite likely that the eggs may be attacked.

In concluding this brief account of the Orthoptera a few words may be said on the endemicity in the islands of the species of the more important genera and families. In the genus *Paratrigonidium* the species are so difficult and have been so little collected in many places that not much confidence can be placed on the correctness of their distribution, as at present known. Yet, no doubt, while some are more widely distributed, others are peculiar to a single island. Thus clearly *P. saltator* of Oahu represents the *P. freycinetiae* of Hawaii, the two being very closely allied and having identical habits. Probably *P. subroseum*, *P. roseum*, and *P. atroferrugineum*, inhabiting Oahu, Maui and Molokai, are modified forms of one original species, for they have peculiar and similar habits. Different in appearance as these are in the adult stage, yet the nymphal stages of all are alike and the nymphs are quite unlike the mature crickets.

The endemicity of the species *Banza* (*Brachymetopa*) is no doubt great, and no one species has been found on more than one island, though it is possible that *B. molokaiensis* and *B. mauiensis* of Molokai and Maui are really one species.

In the Prognathogryllidae, *Prognathogryllus* has not yet been found on Hawaii, though it occurs on Maui, while *Thaumatogryllus* is only known from Kauai. The species of this group appear nearly all to be confined each to one island only, though *Leptogryllus nigrolineatus* has been found on Oahu and Maui and *L. apicalis* on Molokai, Maui and Oahu, and it is possible that these two described species are really only forms of one. *L. forficularis* occurs on Hawaii and in the western mountains of Maui.

Review of Thysanura and Collembola.

Very few species of these interesting insects were observed by me in the islands, and of these a single species of *Japyx*, and two each of *Lepisma* and *Machilis* only have any claim to be considered indigenous. *Campodea* was only noticed in the mountains in the vicinity of Honolulu, in the early years of my collecting, being generally found in decaying stumps or beneath rotting logs. As it was subsequently noticed in the soil, in which foreign plants were imported, there is no reason to doubt that the genus is an importation.

Japyx was only collected very rarely on Kauai, living beneath logs in company with the earwig *Anisolabis perkinsi* (= *A. pacifica*, huj. op. olim). Of the two species of *Machilis*, *M. heteropus* is an abundant species in the forests and is found beneath bark of trees, amongst dead adherent fronds of tree-ferns, and in rotten stumps. Individuals are very numerous and vary in their colour pattern. *M. perkinsi* was only found on Kauai.

Lepisma hawaiiensis is also only known from that island, where it was observed in numbers under bark of forest trees. Another *Lepisma* occurs on rocks near the seashore both on Oahu and Kauai. At least two species of the genus have been seen in houses in Honolulu, where one at any rate is injurious to books and other articles. Some minute Thysanura have been imported in earth containing ants' nests and are now found established in the islands with these ants. One box of plants that I examined a short time after its importation contained several ants' nests in the soil, and many Thysanura infested the nests.

It is quite uncertain whether there are any endemic Collembola in the Hawaiian group, as they are frequently imported with plants, and many have become established and very widely spread. In some forest localities we have noticed that they have become much more numerous than was formerly the case, and this may be taken as evidence in favour of their foreign origin.

The single species of the Achoreutidae, *Neanura citronella*, was the only form observed that struck me as likely to be endemic, since it was found beneath the bark of native forest trees.

Review of Myriopoda.

Of the few Chilopoda other than those which are probably or certainly importations by man, it is quite possible that *Lithobius* and *Lamyctes*, of each of which one species has been described as peculiar, may contain other allied endemic forms. A second *Lamyctes* forms a new variety of a North American species. In the Diplopoda a species of *Polyxenus* (Polyxenidae) and two of *Aporodesminus* (Cryptodesmidae), the latter genus described as new, are of quite uncertain status. They have been found amongst decaying leaves, etc., and are very probably importations. The most interesting feature of the Myriopod fauna, as at present known, is the great development of species of the genus *Dimerogonus*, elsewhere known from New Zealand, Australia and Chili. Twelve species have been distinguished by Dr Silvestri in the systematic portion of this work, and no doubt numerous others were not collected by me. They are apparently most numerous on the intermediate islands of the group, as only one species was collected by me on Kauai and none on Hawaii, though I believe I have since found specimens on the latter island.

Several new additions have been made to the Hawaiian fauna through introductions by man of late years, and we have observed these creatures in boxes of imported plants, when making inspection of these.

Review of Arachnida.

Excluding several undetermined species of quite recent introduction, the Spiders, as at present listed, are represented by 105 species of which 81 are at present only known from the islands. The endemicity of the species is, according to M. Eugène Simon, greater than that known in any other country.

Of about forty families of spiders, 32 are altogether absent from the Hawaiian fauna or are only represented by introduced or foreign forms. These latter are the Sicanidae, Pholcidae, Clubionidae and Agelaenidae, and to these should probably be added the Dysderidae.

The endemic fauna is therefore probably confined to the families Theridiidae, Argiopidae, Thomisidae, Lycosidae and Attidae, or five families only, so far as present information is concerned.

The Theridiidae are represented by five genera, none of them endemic, and one, *Teutana*, is no doubt an introduction, while I suspect that *Argyrodes* comes under the same category, one of its species being known to be foreign and the other probably is so. The single species of *Ulesanis* is also subject to the same suspicion. Excluding these we are left with a single remarkable species of *Ariamnes*, and nine unquestionably endemic species of *Theridion*, of which genus two introduced forms are present.

The Argiopidae have 10 genera, one of which, *Erigone*, contains only a single foreign species, while two *Microneta* and *Cnephalocotes* also contain a single species, each of which may prove to be foreign. *Argiope* contains a widely distributed species, *A. avara*, with a peculiar endemic variety on Kauai, and is probably a comparatively recent, natural immigrant. One species of *Tetragnatha*, *T. mandibulata*, which often abounds in the sugar-cane fields, is introduced, the other species being endemic, as are all the species of *Cyclosa*, excepting *C. oculata* and *turbinata*, both foreign, and those of *Araneus* excepting *A. nauticus*. The genera *Priperia* and *Doryonychus* are only known from the islands.

The Thomisidae are probably the most interesting and important group in the Hawaiian spiders. Three of the genera, *Proernus*, *Pagiopalus* and *Adrastidia*, form an endemic group 'Proerneae,' and the genus *Mecaphesa*, with three species known, is also endemic. Of the other three genera, *Misumena*, *Diaea* and *Synaema*, all the species are peculiar to the islands and no foreign forms have been recognized in the family, though I believe I have noticed an introduced Thomisid in recent years.

The Lycosidae are represented by three genera, one of which, *Syroloma*, is endemic, as are all the species in the others.

The Attidae are represented by a number of endemic species of *Sandalodes*, a genus pertaining to the Australian region, and several imported species of other genera, which of recent years have been added to by fresh introductions not yet determined.

The 81 species at present known only from the islands, represent 24 genera, seven of these being themselves endemic, and it is worthy of note that the endemic species contained in apodemic genera are generally highly peculiar forms, and that the endemic genera are sometimes osculant forms, e.g. *Syroloma*, which is a link between the Lycosidae and certain Clubionidae, and the 'Proernus' group of Thomisidae which forms a link between these and the Clubionidae.

How far the species are restricted in their range in the islands is at present uncertain, owing to the imperfect way in which the spiders have been collected. All those obtained by me were collected while in search of various kinds of insects. Extreme variability is exhibited by *Araneus emmae*, some species of *Misumena*, and *Diaea insulana*. The habits of the Hawaiian spiders have been very little studied, though some of the species are very numerous in individuals. Those of the genus *Theridion* are as abundant as any, spinning their webs usually low down in the vegetation (e.g. across the narrow overgrown tracks made by man or beast through fern), in the cavities of hollow trees, or in hollows in cliffs, etc. *Argiope avara* is one of the most abundant spiders, its strong webs being often conspicuous on the telephone wires, wire fences, etc., as well as amongst vegetation. Its peculiar variety is restricted to and abundant on Kauai. The endemic species of *Tetragnatha* are not usually common and are mostly obtained from branches of trees, being much sought after by the native Passerine birds. The species of *Synaema*, *Misumena* and *Pagiopalus* sometimes greatly resemble the surfaces on which they rest, viz. the lichen-covered boughs of trees, and I suspect many of them are rare, since they are by their habits most subject to the attacks of the many birds that hunt for food along the limbs of large trees. Some species of *Pagiopalus* and *Proernus* are abundant, living at the base of leaves, where these clasp the stem closely, or amongst dead leaves on growing trees. *P. atomarius* has its eggs destroyed both by Dipterous (*Leucopis*) parasites, and by those of an Ichneumonid, and the former are themselves destroyed by the Hymenopterous Chalcid genus *Eupelmus* and by an Eulophid. The Thomisid spiders are, doubtless, extremely ancient inhabitants of the islands. As another Hymenopterous genus, *Baeus*, containing excessively minute insects, parasitic in spider-eggs, also occurs far in the native forests, some spiders are destroyed by these, though the particular hosts have not been ascertained.

Of the Lycosidae species of *Lycosa* and *Syroloma* are found beneath the bark of trees, forming tubes of silk for their retreats. Possibly certain burrows formed in the soil, the occupants of which are not known, belong to others of this group, of which some species have been found amongst dead leaves on the ground. The native species of the Attidae are often noticed hunting on the trunks or limbs of forest trees, and hide themselves and nest beneath the bark. They are an important source of food-supply for the native birds. Generally speaking it would appear that the native spiders, which live on low vegetation near the ground, or in places not much investigated by the endemic birds, are by far the most numerous in individuals.

Review of Mollusca.

The Mollusca[1], as listed in Vol. II. p. 271 *et seq.* are 476 in number. These represent 15 families, but of these, five (Philomycidae, Limacidae, Helicidae, Stenogyridae and Paludestrinidae) are unimportant, containing only species that are introduced or possibly in a few cases immigrant.

The chief interest is attached to the endemic family Achatinellidae, of which there are eight genera containing in all 311 species.

The Tornatellinidae contain 14 species of *Tornatellina* and 20 of *Auriculella*. Twenty-seven species of *Succinea* (Succineidae) have been described, and the Endodontidae are represented by 24, and the Zonitidae by 25 species. It will be seen therefore that the great majority of species of land molluscs are contained in comparatively few genera.

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[1] I was only able to devote very little time to the collecting of Mollusca, and a great deal of my time was spent in localities, where these are very poorly represented. Only a very brief account of these animals is here given, since they have been so much more studied by Dr Montague Cooke, Curator of Mollusca in the Bishop Museum, and others than by myself, and many new species have been described since Mr Sykes published his paper in Vol. II. of this work.

The earliest record of the existence of slugs in the islands, that I have been able to find, is contained in the MSS. of one of the old bird collectors (Bloxam) who found 'slugs in the maw' of *Oreomyza*, shot on Oahu near Honolulu. I suspect, however, that this remark really applied to *Succinea*, which is very rarely eaten by some birds. We have never found Limacidae to be eaten by them, and the Philomycidae are certainly of quite recent introduction. The species of *Agriolimax* and *Amalia*, though some have been described as peculiar to the islands, have not the appearance (from their distribution, etc.) of being native, but are probably all introductions by man.

The Zonitidae (with seven genera) were little collected by me. *Godwinia tenella* was found at a higher elevation (9000 ft.) than any mollusc that I met with. The Endodontidae are, no doubt, numerously represented by endemic species. Some of the species are common beneath the bark of trees, and are particularly fond of *Cheirodendron*. Others occur beneath large decayed logs, or on the ground amongst decayed leaves.

Of the Helicidae the introduced *Eulota* is now widely spread and extremely common in many places. It has been observed high up the mountains on Hawaii. *Papuina barnaclei* is in the list probably on account of the specimens having been wrongly labelled as to locality.

The very minute shells of the genus *Pupa* of the Pupidae were not collected by me. The species are numerous and often found in a sub-fossil condition.

Of the Achatinellidae, the sub-genus *Achatinella*, s. str., is found only on Oahu, as also is *Bulimella*, both with numerous species or at least local forms. *Partulina* is entirely confined to the three adjacent middle islands, Maui, Molokai and Lanai, excepting that the aberrant species *A.* (*P.*) *dubia* is found on Oahu, and two or three aberrant forms, for which a distinct sub-genus (*Baldwinia*) has been proposed, are peculiar to Hawaii. *Achatinellastrum* is chiefly developed on Oahu, but also occurs on Maui, and is barely represented on Molokai. The distribution of these sub-genera is of great interest.

The beautiful shells of *Achatinella* (s.l.) have been so much studied and collected by others that it is not necessary for me here to make any lengthy remarks. Practically all the species, except on rare and probably accidental occasions, are of arboreal habits. They are found on leaves, branches or trunks of the forest trees, and individuals of a species are frequently not at all particular as to what part of the tree they frequent, nor as to the species of tree. They are often found numerously on quite dead trees, and in many places are abundant on those imported by man, especially the guava, and even on *Lantana camara*. The Myrtaceous 'Ohia' being the dominant forest tree probably contains more of these shells than any one other species of plant. It is doubtless due to the fact that the Achatinellas do not feed on the trees themselves, but on the small organisms that grow on these, that they are found on so many native and foreign plants. Great diversity of opinion exists as to the limits of the species of *Achatinella* (s.l.) and a very great deal of special breeding will probably be necessary before these limits can be fixed. It is quite certain that a very large number of the forms, that have been described as distinct, are not true species in the same sense that the majority of the species of insects are. On the whole the phenomena of variation in *Achatinella* are rather different from those exhibited by the variable forms of insects, but these are probably explicable by the very stationary habits of the Mollusca, and the difference between the two groups is rather of degree than of kind. On the other hand, I think it probable that a good many of the forms of *Achatinella*, which differ very little in appearance or structure, are absolutely distinct species. In this they are quite paralleled by many insects, for we know that in these, perfectly distinct species are sometimes separated by characters apparently much smaller than those exhibited by the extreme varieties of other species. There are numerous cases in insects where one particular variety of a very variable species has its peculiarities exactly reproduced as a constant specific character of an allied species, and I have found, as I interpret the species, exactly similar cases in *Achatinella*. But in the insects the complexity of structure allows us to be certain of the real specific distinctness of such forms, owing to structural differences that exist to confirm it, whereas the Mollusca (at least as studied from the shells) are very poorly endowed with structural characters, on which to base specific distinctions, as compared with even the most simple form of insect, and one is obliged to place more or less faith in colours and patterns of colour. In many groups of Hawaiian insects such characters, if relied on for discriminating species, would lead to hopeless confusion.

It has always been a tradition with the natives that the Achatinellas are able to sing or produce musical sounds, but I know of no confirmation of this excepting the often-quoted observation by Barnacle. Though I have lived for weeks in spots where shells were to be found on the trees immediately surrounding my camp, I have never heard any such sounds. So confirmed were the natives in their opinion, that the song of the land-shells was even put to words. An old native, whom I once had with me in the mountains of Oahu, one night called my attention to the song of a land-shell, but I actually found the creature, a species of small cricket (*Paratrigonidium*) that was making the sounds. Though the motions of the elytra in producing its song were quite visible, he utterly declined to believe that it was caused by the cricket, and persisted that it was due to a land-shell. I would suggest that what Mr Barnacle heard (making allowance for an exaggeration in description) was the stridulation of crickets beneath the bark of a tree, where they often congregate, and what he saw was a group of *Achatinella* on the bark. Several natives have informed me that the real singing shells were found especially on the 'Ki' plant (*Cordyline*), and it is certainly curious that this same plant is a favourite home of the larger green crickets of the genus *Banza*.

The bright coloration of the Achatinellas, especially of many of the banded forms, is of some interest, because it reminds one so strongly of many other animals, in which a somewhat similar strong contrast of colours is supposed to produce the effect of rendering the creatures less visible, and to be of value for protective purposes. Utterly conspicuous as the shells appear when removed from their surroundings, it is quite certain that, in spite of their bright colours, they are by no means so when resting on the leaves or branches of trees, except for occasional specimens in incongruous positions. This is quite evident from the fact that a skilled collector, with very practised eye in discovering these shells, will go over the very same trees that have just been well searched by one less accomplished and gather an astonishing number of shells from these. The remarkable fact is that though these colour patterns must have been developed on the spot, the Achatinellas would not appear to have had any need for concealment. Not even once were these shells ever found within birds, nor seen to be eaten by them, and it is astonishing that the thrush genus *Phaeornis* should not have availed itself of such an abundant source of food. It is true that the introduced rats, imported by man, feed eagerly on these Molluscs, so much so that I have gathered a hatful of empty shells of *Achatinella tesselata* at the foot of a single hollow tree, into which the rodents had carried them. But these cannot be supposed to have been a factor in determining the colour patterns. Similarly we find the terrestrial Achatinellidae of the genus *Amastra* all of dull colours and in strict harmony with their environment, these being equally neglected by birds, but devoured by imported rats. Either, therefore, from some unknown cause these land Mollusca become adapted in colour to their environment, or if these colours have been modified and controlled by causes elsewhere supposed to be efficient, this must have taken place in past ages and under different faunistic conditions. In the latter case it would be natural to consider the coloration, as having been determined by the ancestors of the existing species of the thrushes (*Phaeornis*) from the Kauai form of which, on one occasion, a minute Helicine shell was obtained by dissection. Further observations on Lanai and Molokai may yet prove that these birds do still on occasion feed on Achatinellas; but the numerous young and old birds that I examined at various seasons gave no evidence of this, and further we are perplexed by the entire absence of *Phaeornis* from Maui, unless we suppose the genus to have once existed there and now become extinct, as we know to be the case with the *Phaeornis oahuensis* on Oahu.

The other genera of Achatinellidae (i.e. the true genera as distinguished from the sub-genera of *Achatinella* itself, above mentioned) are of no less interest.

Perdicella is a comparatively small genus of prettily marked arboreal shells. *P. helena* is an abundant and variable species widely distributed on Molokai, but most of the known forms appear to be rare or very local. It is found on the leaves of Ki, Ohia and various other plants. *P. minuscula*, recorded on my specimens as being found on Molokai, must, I think, have been wrongly labelled, since I observed a species of *Perdicella* in numbers on Urticaceous plants in the Iao valley, Maui, on one occasion, and collected specimens. The genus is restricted to Molokai and Maui.

The elongate shells of the genus *Newcombia* are also restricted to these two islands and almost to Molokai. *N. cinnamomea* and allied species are found on the trunks and branches of 'Pua' trees (*Olea sandwichensis*) and are very well concealed and not very likely to be noticed unless specially sought for.

Amastra with 101 and *Leptachatina* with 76 species are the genera most widely distributed, species occurring on all the islands, though Kauai and Hawaii at either end of the group are comparatively poor in species. The species of *Amastra* (*s. s.*) are essentially terrestrial and found beneath and in cavities of rotten logs and tree-ferns, under stones, in decayed stumps, in the hollows and crevices of hard logs, and amongst decaying vegetable débris, in damp places in the forest. On Kauai (though not peculiar to it) the smaller sub-genus *Amastrella* is dominant. Here too are the two most remarkable forms of the small sub-genus *Kauaia*. The species of the sub-genus *Laminella* are of great interest from their habits, being transitional in these between *Achatinella* and *Amastra* (*s. s.*). They are largely of arboreal habits, many of them being found especially on the trunks and dead branches of trees even at a considerable height; they have the habit of smearing themselves with mucus, to which fragments of débris become attached, so that they closely resemble the surface on which they rest. Some of the species are particularly fond of Urticaceous plants and may be found on the leaves of these as well as on the trunks. *L. gravida* is sometimes found in great colonies on the fronds of soft-leaved ferns. *L. depicta* is abundant in the highest boggy forests of Molokai on the leaves of *Astelia*, above the range of other Achatinellas, and there is an allied species in similar localities on the W. Maui mountains. The small shells of the genus *Leptachatina* resemble those of *Amastra* (*s. s.*) in their habits and are often found in company with the latter. *L. arborea* is common on trees on Hawaii and of wide distribution, and even occurs on the leaves of *Myoporum* in the higher forests, above the rain-belt.

Thaanumia omphalodes is a remarkable development of *Leptachatina*, and apparently very rare. I have never met with it.

Carelia, containing the largest Hawaiian shells, is peculiar to Kauai, though it formerly existed also on Niihau. Living specimens are now scarce, but in some parts of the lower forests of Kauai many dead ones (mostly broken) were noticed, in witness of their former abundance. In some of these localities they were accompanied by many dead shells of *Kauaia* and the remains of the large weevils of the genus *Rhyncogonus*, all species still existing, but rare.

Of the Tornatellinidae the very minute shells of the genus *Tornatellina* are very numerous and occur on all the islands. They were only casually collected by me and are doubtless very numerous in species. Some species occur quite outside the forest, at low elevations.

Auriculella is very abundant on Oahu, species and individuals being numerous. They are variable not only in colour, but in the fact that some of the species have either dextral or sinistrorsal shells. Colonies of a species differ greatly in this respect, even when found at no great distance from one another. Of one species a large number of examples taken together had about 50 per cent. dextral and the same number sinistrorsal, while a near-by colony had only two per cent. of the one form. They are arboreal in their habits and, making allowance for their small size, they appeared to me much more conspicuous than the Achatinellas.

The Succineidae are found throughout the group, but are dominant on the large island of Hawaii. Twenty-seven species of *Succinea* were enumerated by Sykes, but the limits of the species appear to be even less definite than in the Achatinellas. The *Succineae* are able to thrive under the most diverse conditions of climate, though probably best developed in the true forest-belt. Some species are common in the open country at elevations of about 5000 ft., where there is little permanent moisture, and some even abound on the hottest and driest coasts. In many parts of Hawaii both the surface of the ground is covered with their empty shells and the humus filled with these, while on other of the islands, where now they are less numerous, there are great deposits, mixed with the shells of *Amastra*, *Leptachatina*, and various other living genera.

The other families of Mollusca are comparatively of little importance, but it may be mentioned that *Limnaeus pereger* is the species of fresh-water snail, in which Dr Lutz found the Redia of the Liver Fluke.

Remarks on Vermes.

Although a considerable number of species of earthworms was collected by me at various stations, often very remote from settlements, throughout the islands, I believe that all these are importations by man. On several occasions boxes of earth containing growing plants were examined, when they were landed from steamers arriving in Honolulu from China and Japan, and were found to contain great numbers of very lively and healthy earthworms. Some of these were preserved and found to be identical specifically with species that now are found far from settlements in the mountain forests. Some earthworms were specially collected in the most out-of-the-way forests in boggy places, where nearly every animal was endemic, but these proved to be only well-known foreign forms, such as *Allolobophora foetida*, etc. As plants have been imported continually into the islands both from America and the Oriental region for the course of a century, there has been ample time for foreign worms to become very widely distributed. Of late years it has been illegal to introduce plants in earth, for economic reasons, in order to keep out insect pests, so that the number of species that now occur (and doubtless some have been introduced since I made my collections) may not be so quickly added to.

The Entozoa recorded from the islands are of no interest faunistically, excepting the remarkable *Apororhynchus hemignathi*, taken from the Drepanid bird *Hemignathus procerus* on Kauai, and forming the endemic family Apororhynchidae of the Acanthocephala, and *Drepanidotaenia hemignathi*, belonging to an apodemic Cestode genus, with the same host. Another tapeworm was found in another Drepanid bird, *Loxops caeruleirostris*. It is curious that no Entozoa were noticed in birds excepting on Kauai.

DESCRIPTION OF PLATE I. (INTRODUCTION.)

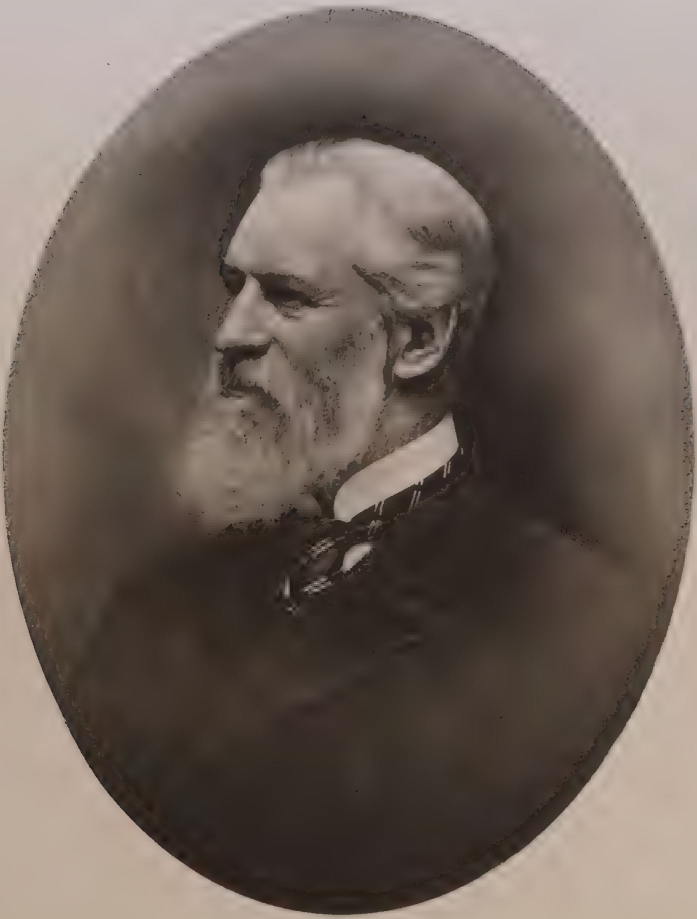
Likeness of the Honourable Charles Reed Bishop, aet. 88, Founder of the Bernice P. Bishop Museum at Honolulu, and to whom the Fauna Hawaiiensis is dedicated.

Chas R. Bishop

DESCRIPTION OF PLATE II. (INTRODUCTION.)

Likeness of Sir William Henry Flower, the first Chairman of the Committee.

[illegible] INTROD. PLATE II.



W. H. Flower

DESCRIPTION OF PLATE III. (INTRODUCTION.)

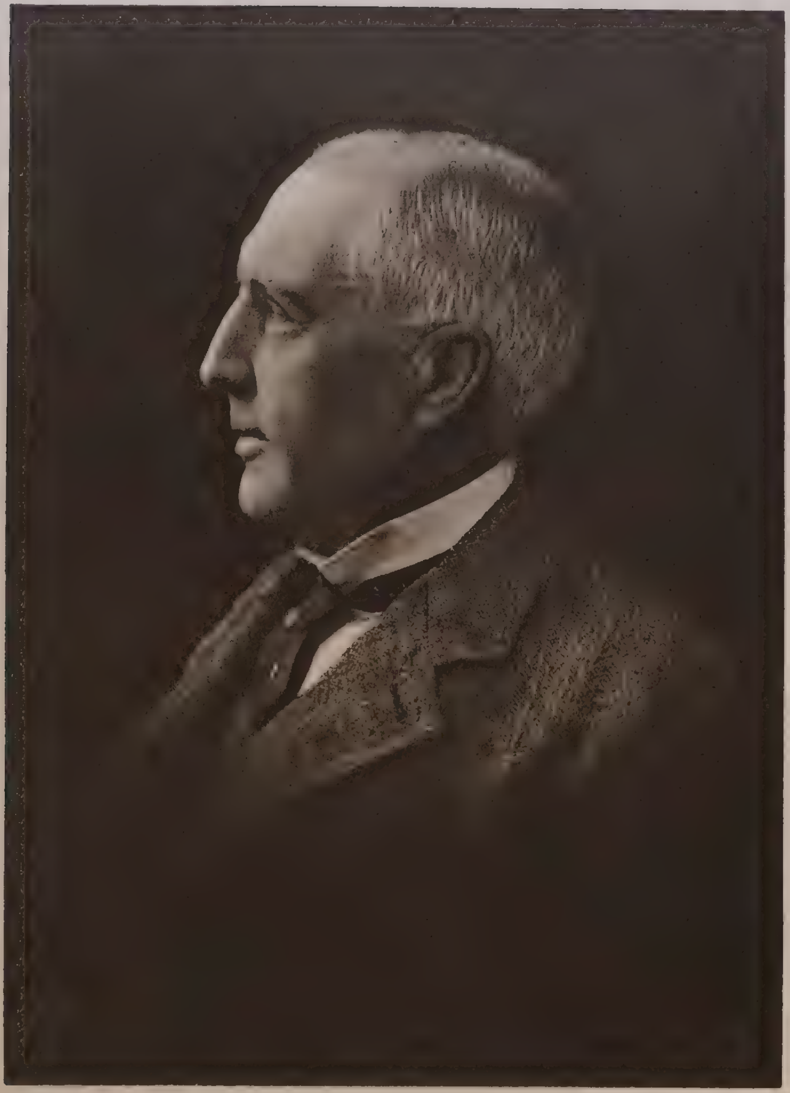
Likeness of Professor Alfred Newton, for many years Chairman of the Committee.

By permission of the Master and Fellows of Magdalene College, Cambridge, from the painting, by Lowes Dickenson, in the Combination room of the College.

Alfred Newton

DESCRIPTION OF PLATE IV. (INTRODUCTION.)

Likeness of Dr Frederick Du Cane Godman, at present Chairman of the Committee.



F. D. Godman.

DESCRIPTION OF UNNUMBERED MAP ISSUED WITH VOL. I, PART I.

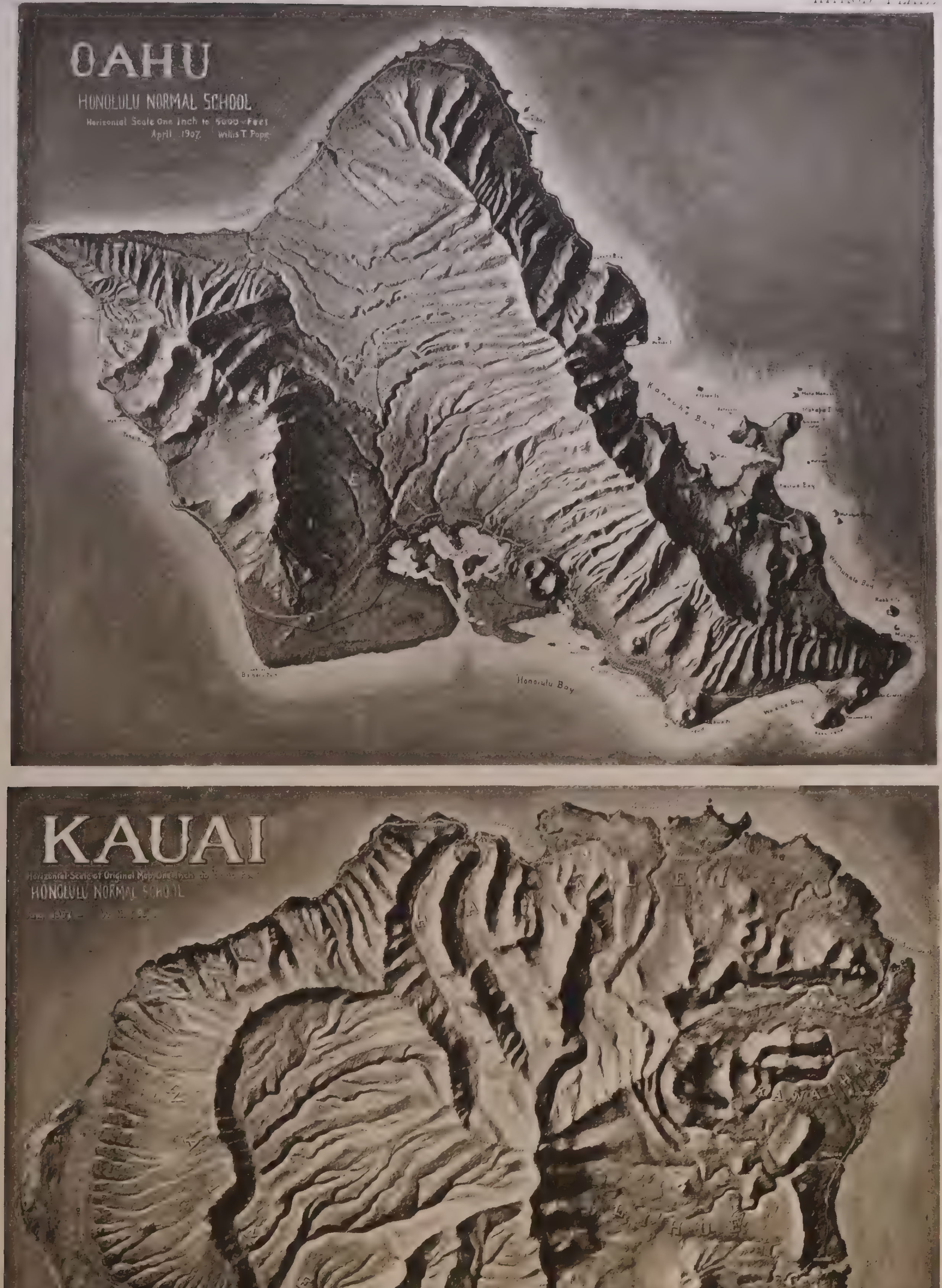
This map shows the positions and sizes of the islands, as well as the intervals between them. The northern part of the island of Hawaii is said to be more ancient than the southern portion.

The extremely rugged surface of the islands is shown in the following 4 plates.

DESCRIPTION OF PLATE V. (INTRODUCTION.)

Relief-maps of the islands of Kauai and Oahu: horizontal scale one inch to 5000 feet.

For permission to make use of this and the next three plates of maps we are indebted to Mr Willis T. Pope of Honolulu.

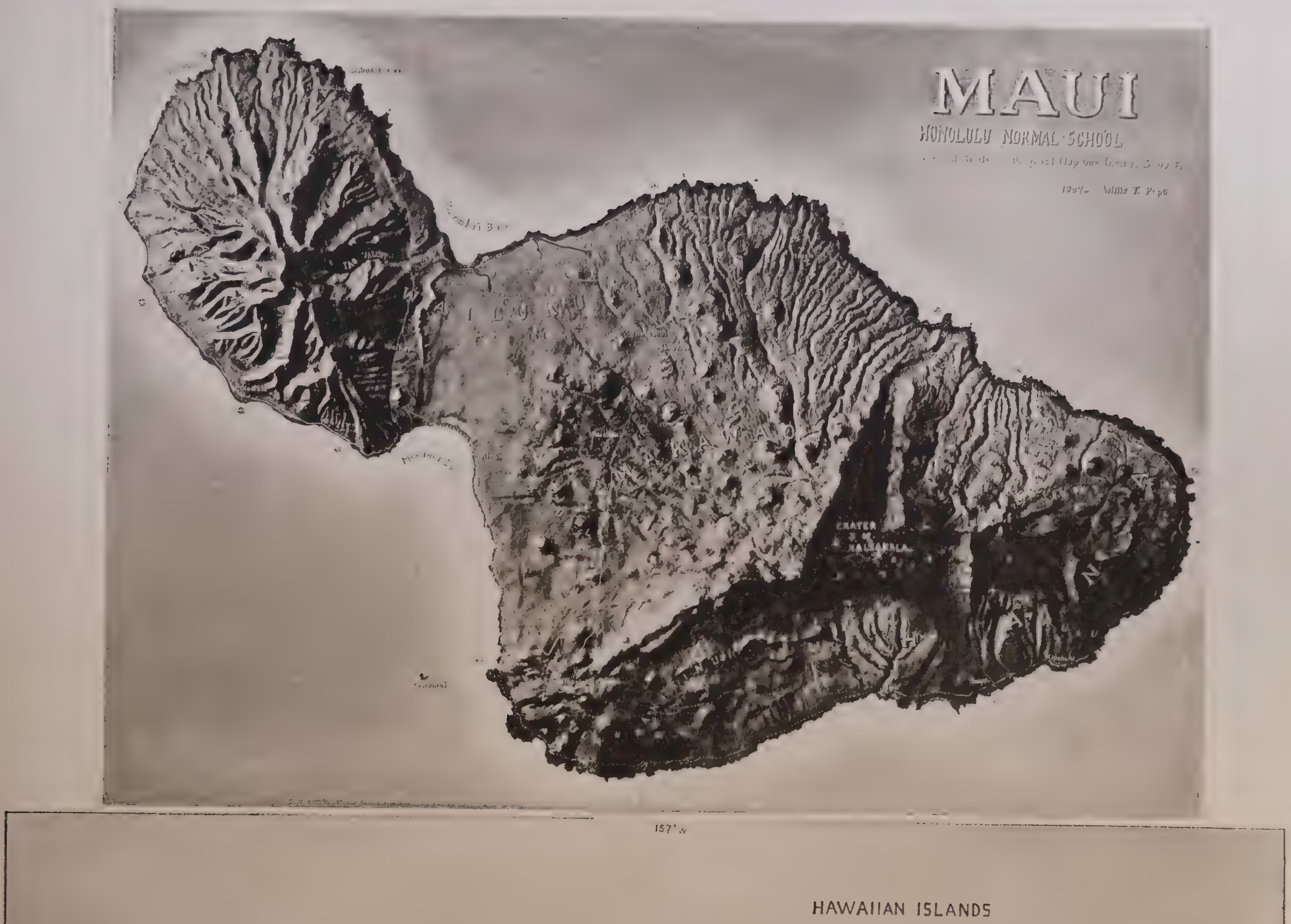

OAHU
HONOLULU NORMAL SCHOOL
Horizontal Scale One Inch to 5000 Feet
April 1907. Willis T. Pope
Kaneohe Bay
Waimanalo Bay
Honolulu Bay
Waikiki Bay
KAUAI
Horizontal Scale of Original Map One Inch to
HONOLULU NORMAL SCHOOL

Relief map. Oahu & Kauai

DESCRIPTION OF PLATE VI. (INTRODUCTION.)

Relief-maps of the islands of Maui and Molokai. The scale of the map of Maui is 1 inch to 5000 ft.; that of Molokai is measured on the map.

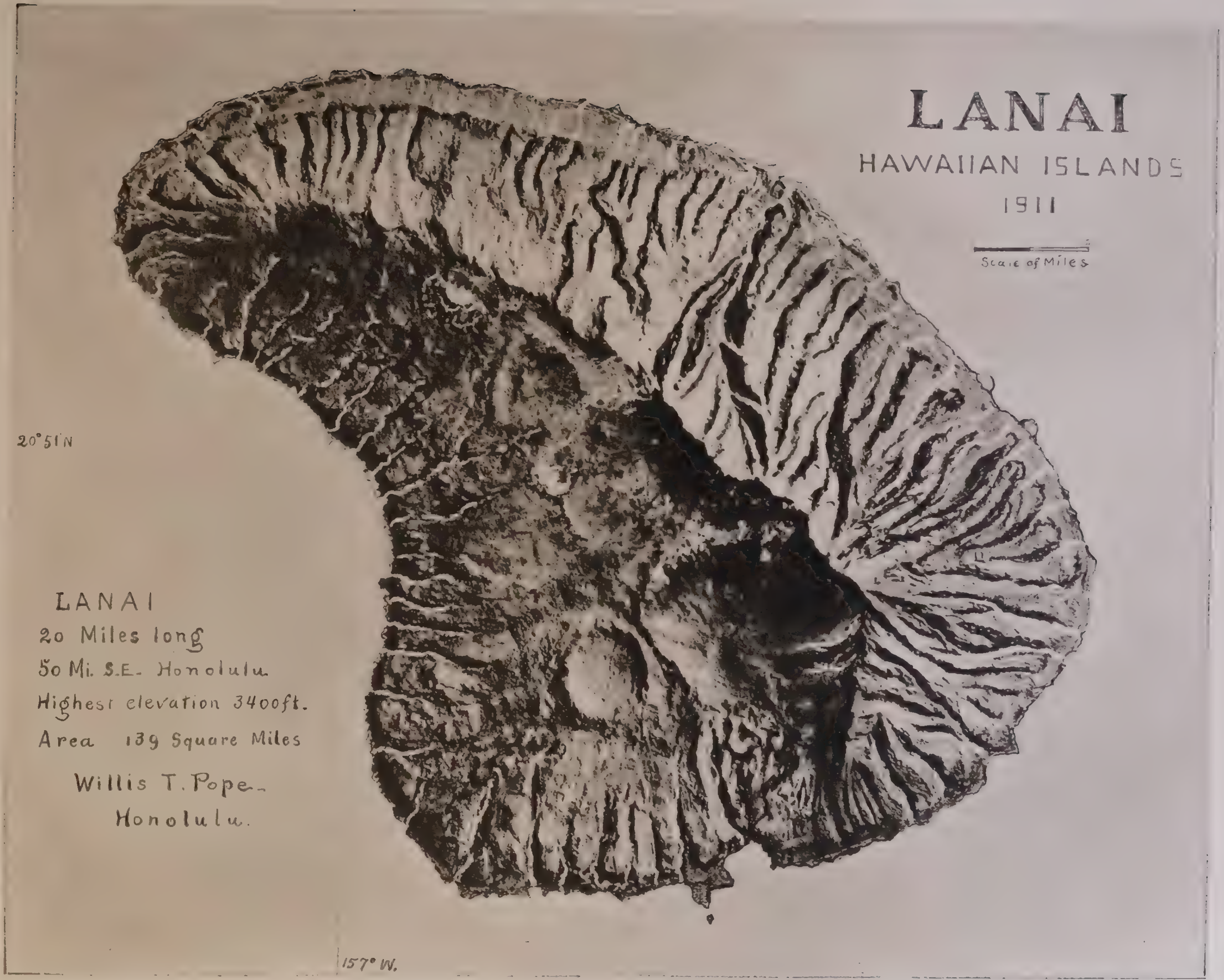
It will be seen that Maui consists of two islands united by the strip of lowland lying between the Bays of Kahului and Maalaea.



Relief map. Maui & Molokai

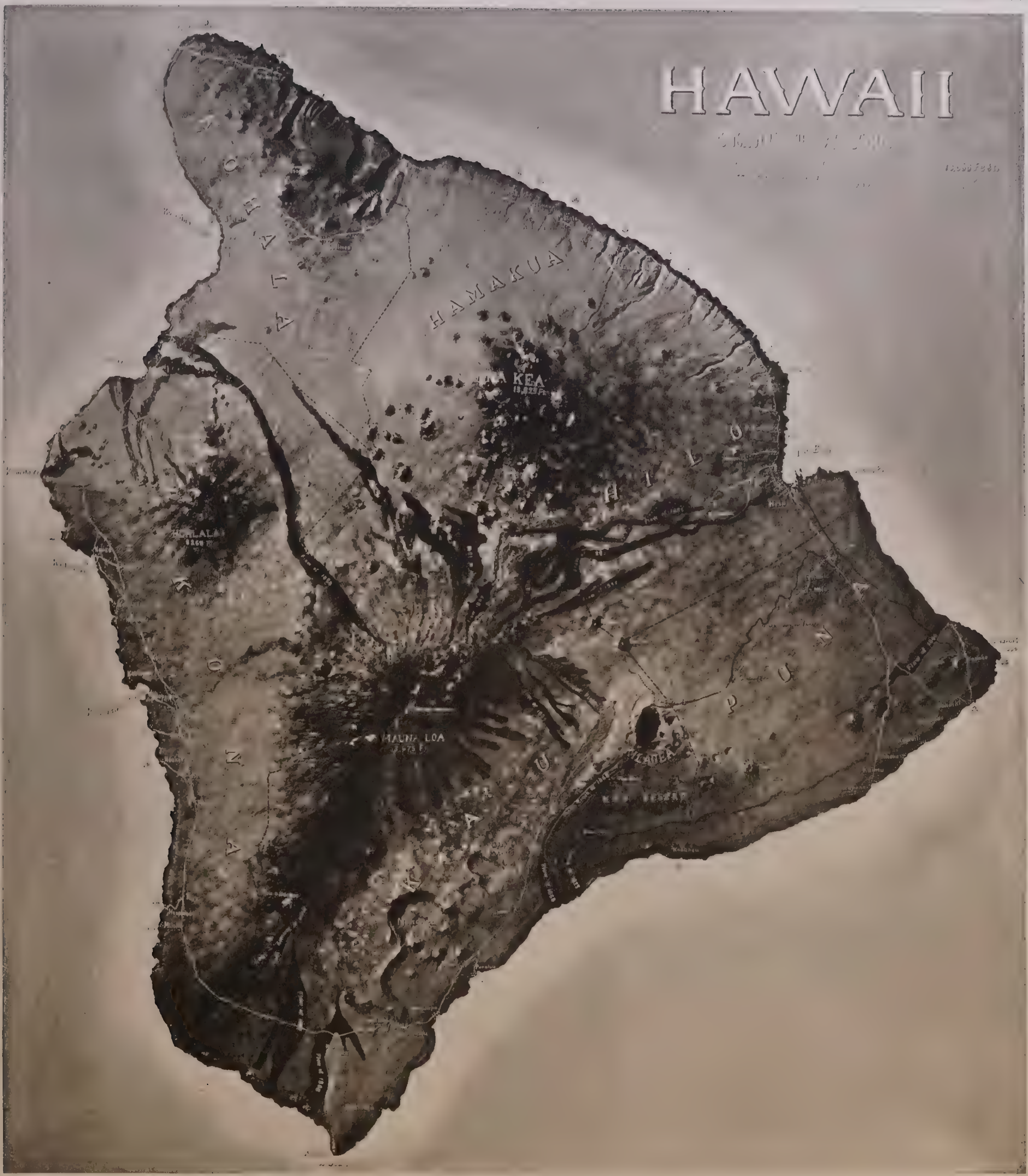
DESCRIPTION OF PLATE VII. (INTRODUCTION.)

Relief-map of the island of Lanai. The scale is measured on the map.


LANAI
HAWAIIAN ISLANDS
1911
Scale of Miles
20°51'N
157° W.
LANAI
20 Miles long
50 Mi. S.E. Honolulu
Highest elevation 3400ft.
Area 139 Square Miles
Willis T. Pope.
Honolulu.

DESCRIPTION OF PLATE VIII. (INTRODUCTION.)

Relief-map of the island of Hawaii. The scale in this case is only 1 inch to 10,000 ft, this island being much larger than either of the others.

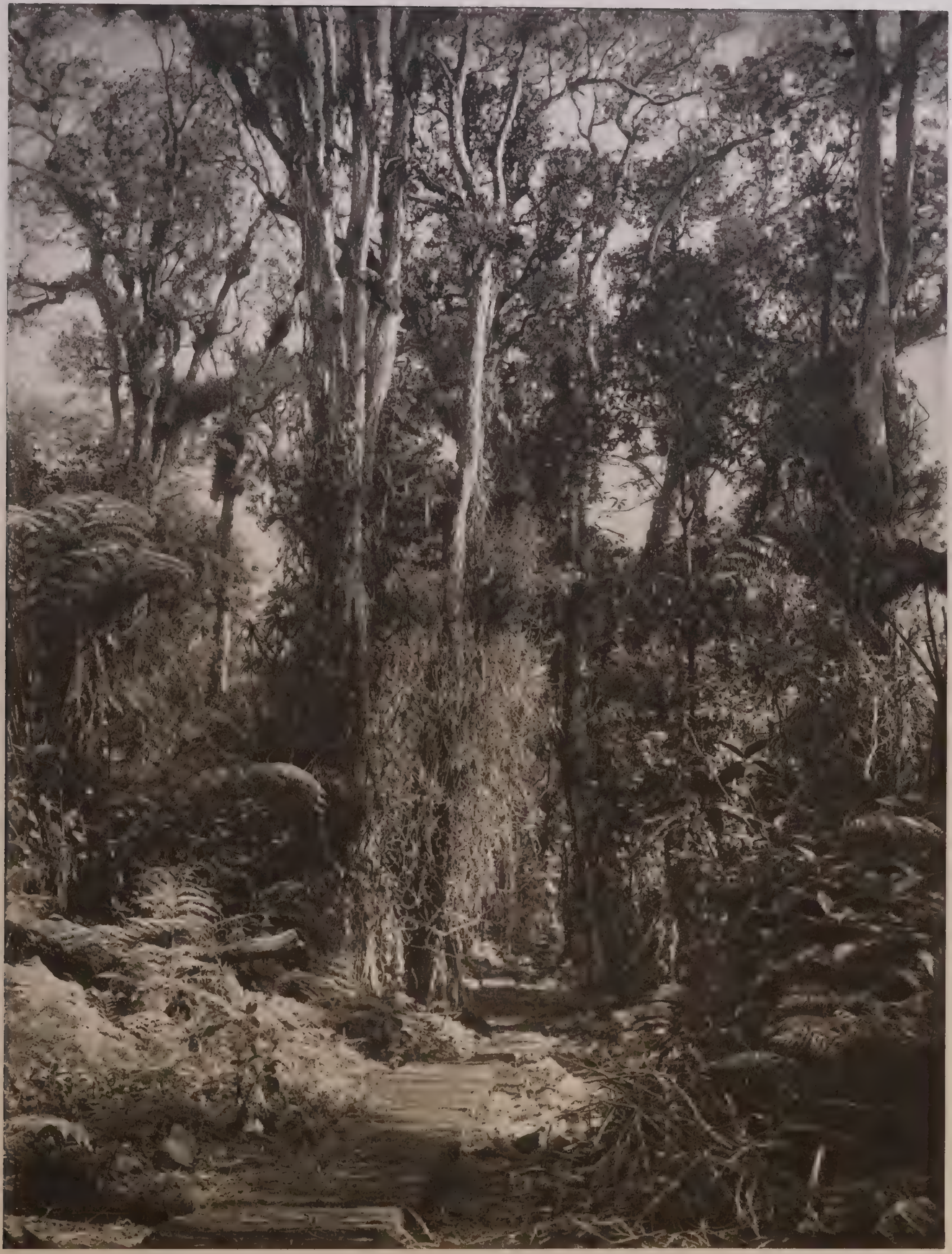


Relief map. Hawaii

DESCRIPTION OF PLATE IX. (INTRODUCTION.)

Forest of windward Hawaii at an elevation of about 2500 ft. A path has been formed of sections of the stems of tree-ferns, which here are conspicuous and of great size. The forest trees are chiefly Ohia (*Metrosiderus*) densely covered with climbing *Freycinetia*, forming impenetrable masses, until cleared. The large-leaved plant near the lower corner on the right of the picture is the Urticaceous 'Olona' (*Touchardia*).

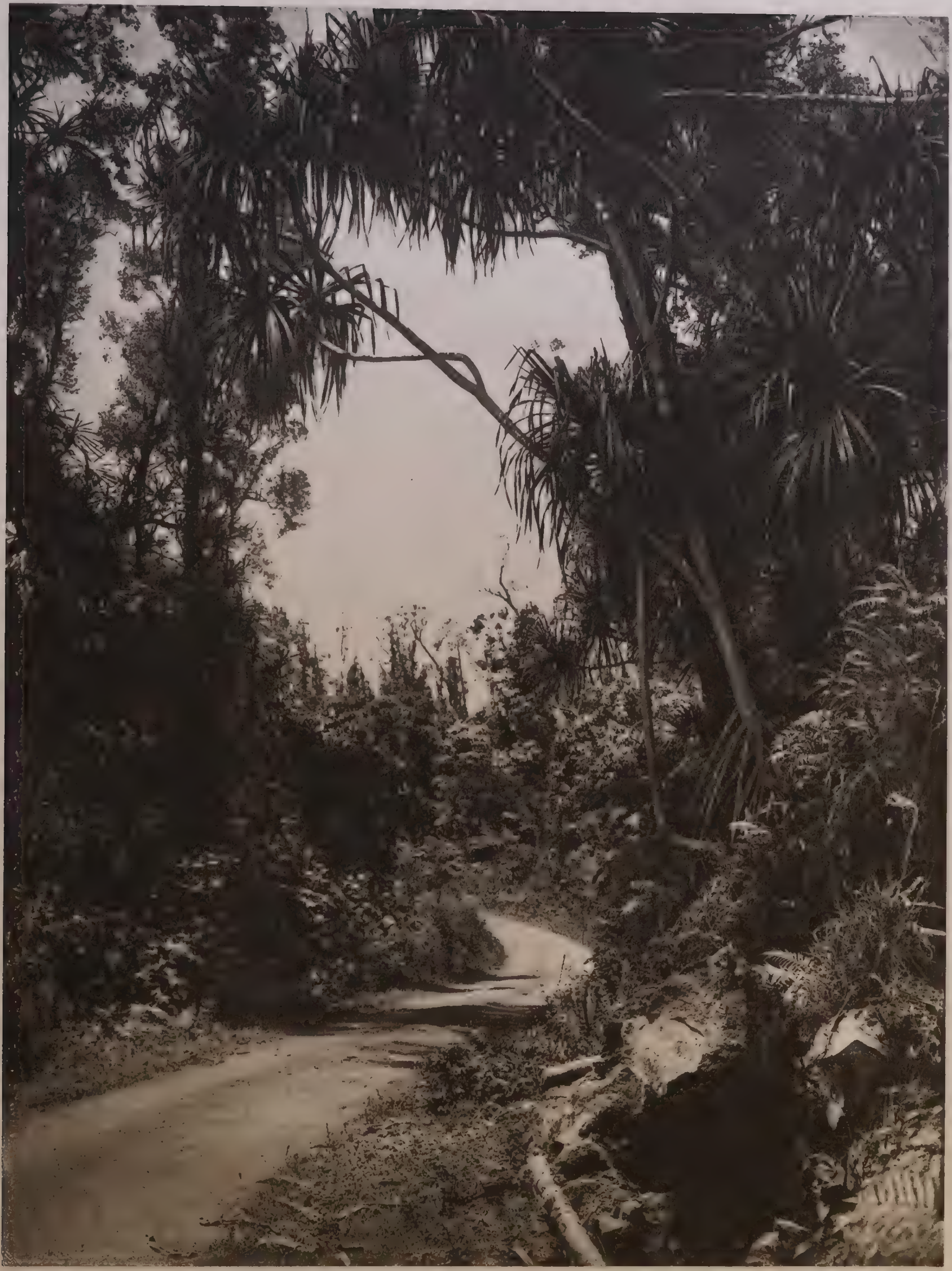
Plates IX—XII are from photographs by Mr H. W. Henshaw, now chief of the Biological survey at Washington, U.S.A.



Landscape; Hawaii. 2,500 feet.

DESCRIPTION OF PLATE X. (INTRODUCTION.)

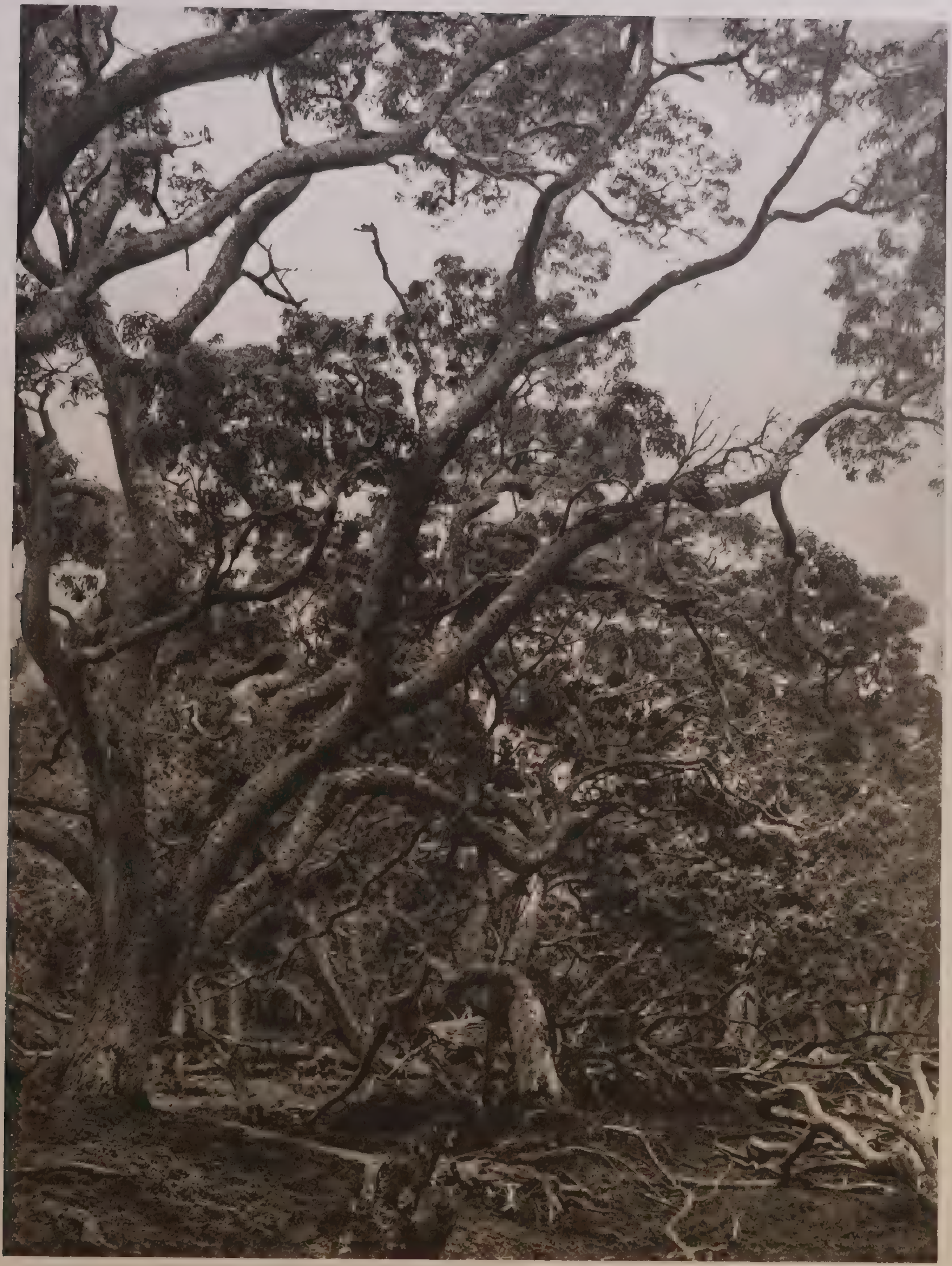
Forest of windward Hawaii below 1000 ft. elevation. The common *Pandanus odoratissimus* is conspicuous, with bushes of *Pipturus albidus* and tall specimens of *Maba sandwichensis*. These forests are largely overrun by introduced ants, and the endemic Coleopterous fauna has been destroyed or nearly so.



Landscapes in the woods of heavy rainfall.

DESCRIPTION OF PLATE XI. (INTRODUCTION.)

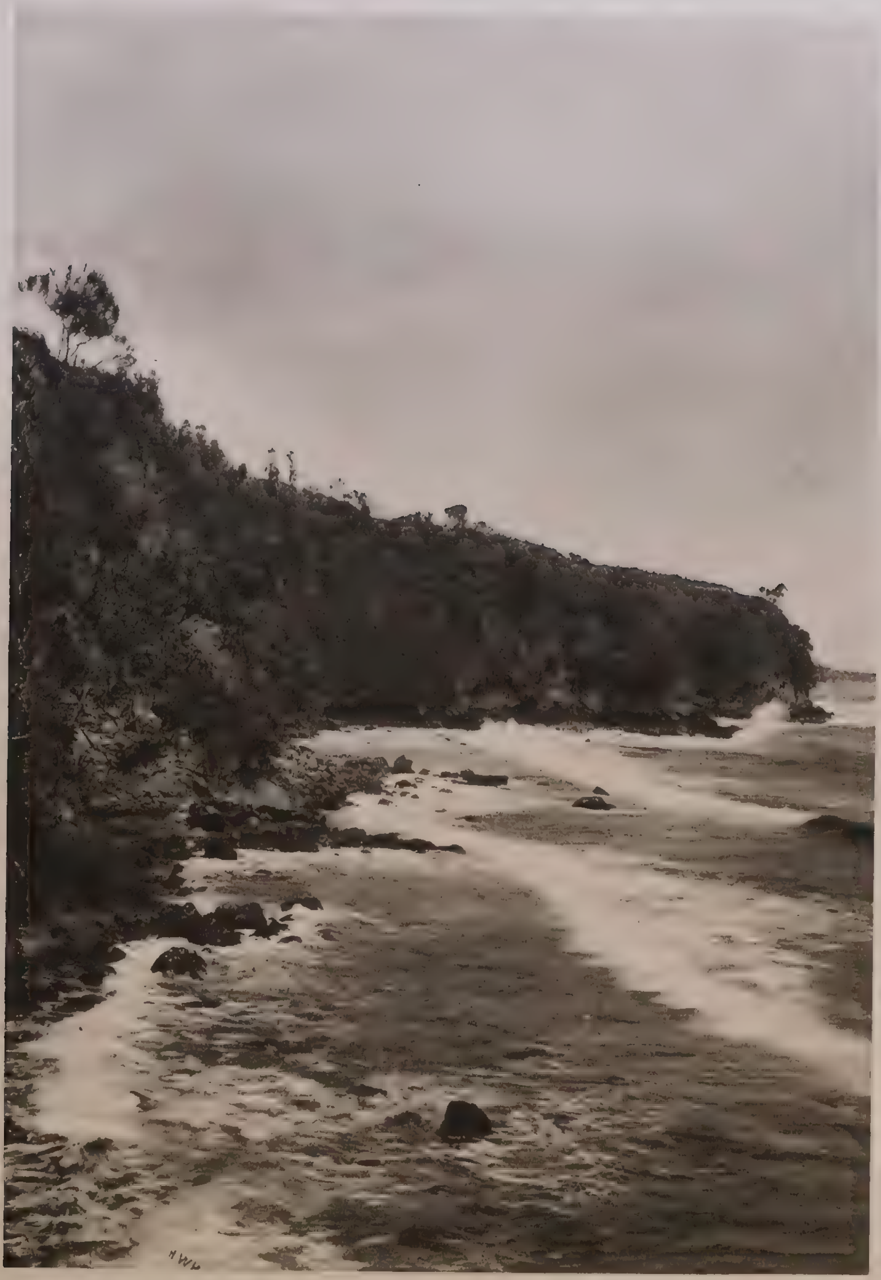
Forest of *Acacia koa* at 4000 ft. elevation near the crater of Kilauea, Hawaii. This picture shows well the effect of running cattle in Hawaiian forests, many of the trees being partly or largely dead. The natural dense growth of ferns or other undergrowth, which retains moisture, has disappeared, and unless the cattle are removed no fresh trees will spring up.



Landscape: Koa Tree Forest

DESCRIPTION OF PLATE XII. (INTRODUCTION.)

Coast of windward Hawaii, showing natural vegetation. In this spot, owing to the steep nature of the coast, the vegetation has not been destroyed along the sea margin, though immediately behind the cliffs the land is now cultivated and mostly occupied by foreign plants. Native insects have, however, been mostly destroyed by introduced forms, even where natural vegetation remains.



Landscape; a bit of the coast

DESCRIPTION OF PLATE XIII. (INTRODUCTION.)

Oreomyza montana of Lanai, *O. flammea* of Molokai and *O. newtoni* of Maui (in order from top to bottom of plate).

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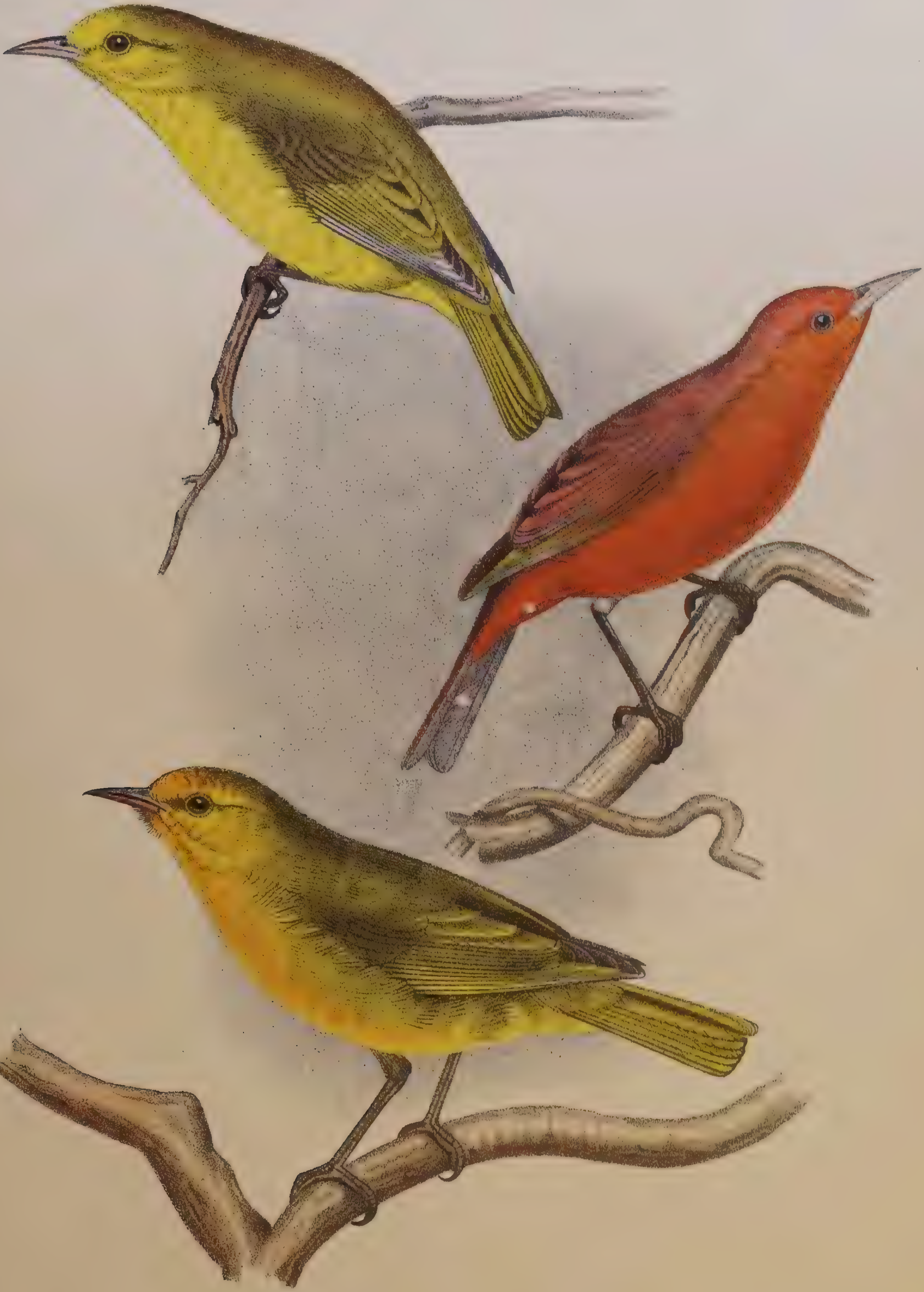
INTRODUCTION. PLATE [illegible]



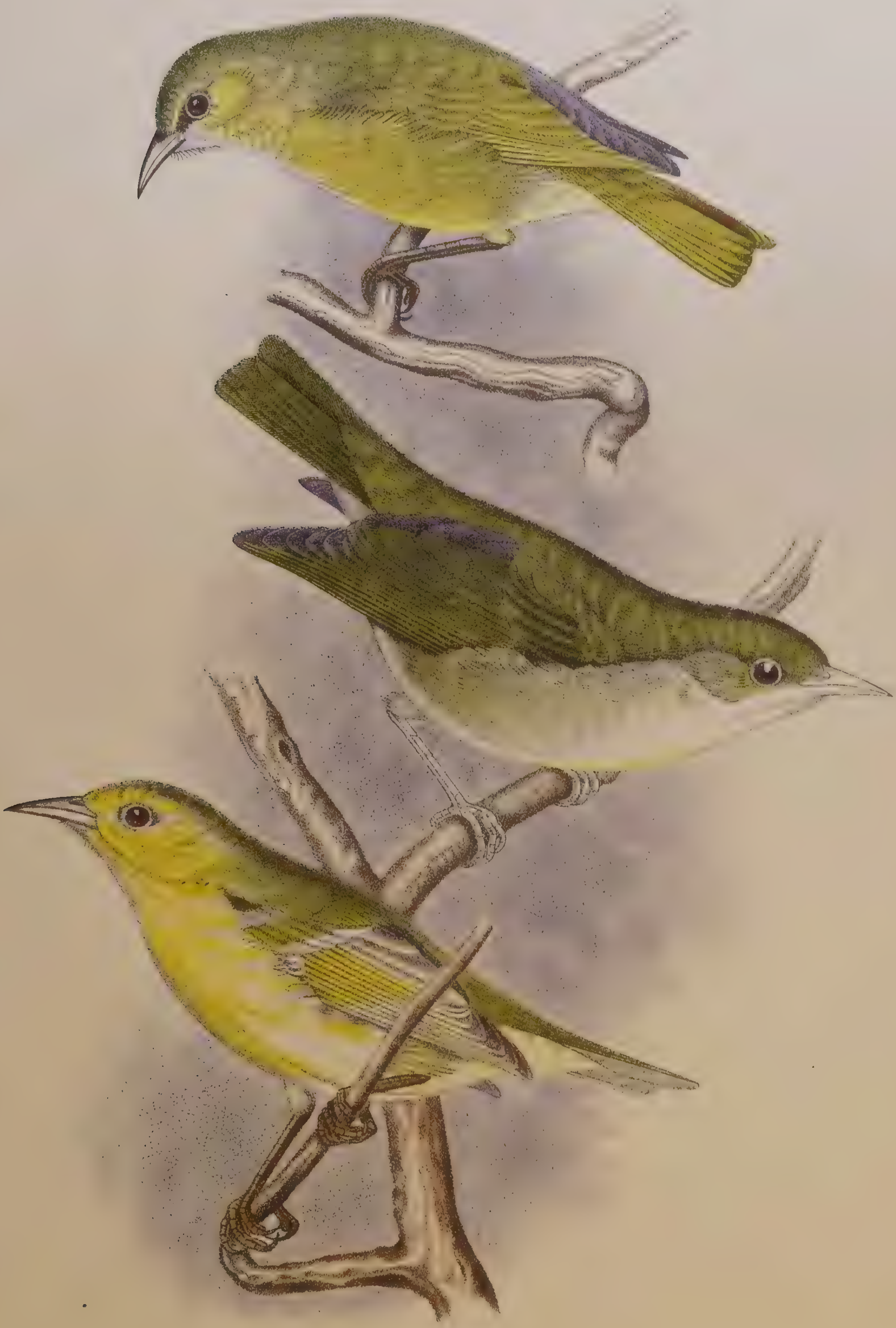
Edwin Wilson, Cambridge.

Birds, Oreomyza.

DESCRIPTION OF PLATE XIV. (INTRODUCTION.)

Oreomyza mana of Hawaii, *O. bairdi* of Kauai and *O. maculata* of Oahu (from top to bottom of plate).

This genus exhibits the modification of forms isolated from one another, each forest-bearing island having its own more or less peculiar species. It may be noticed that the species inhabiting the two extreme islands, Kauai and Hawaii, are more closely allied to one another than to those of the intermediate islands, while those of the latter form a group of closely allied species.



Edwin Wilson, Cambridge.

Birds, Oreomyza.

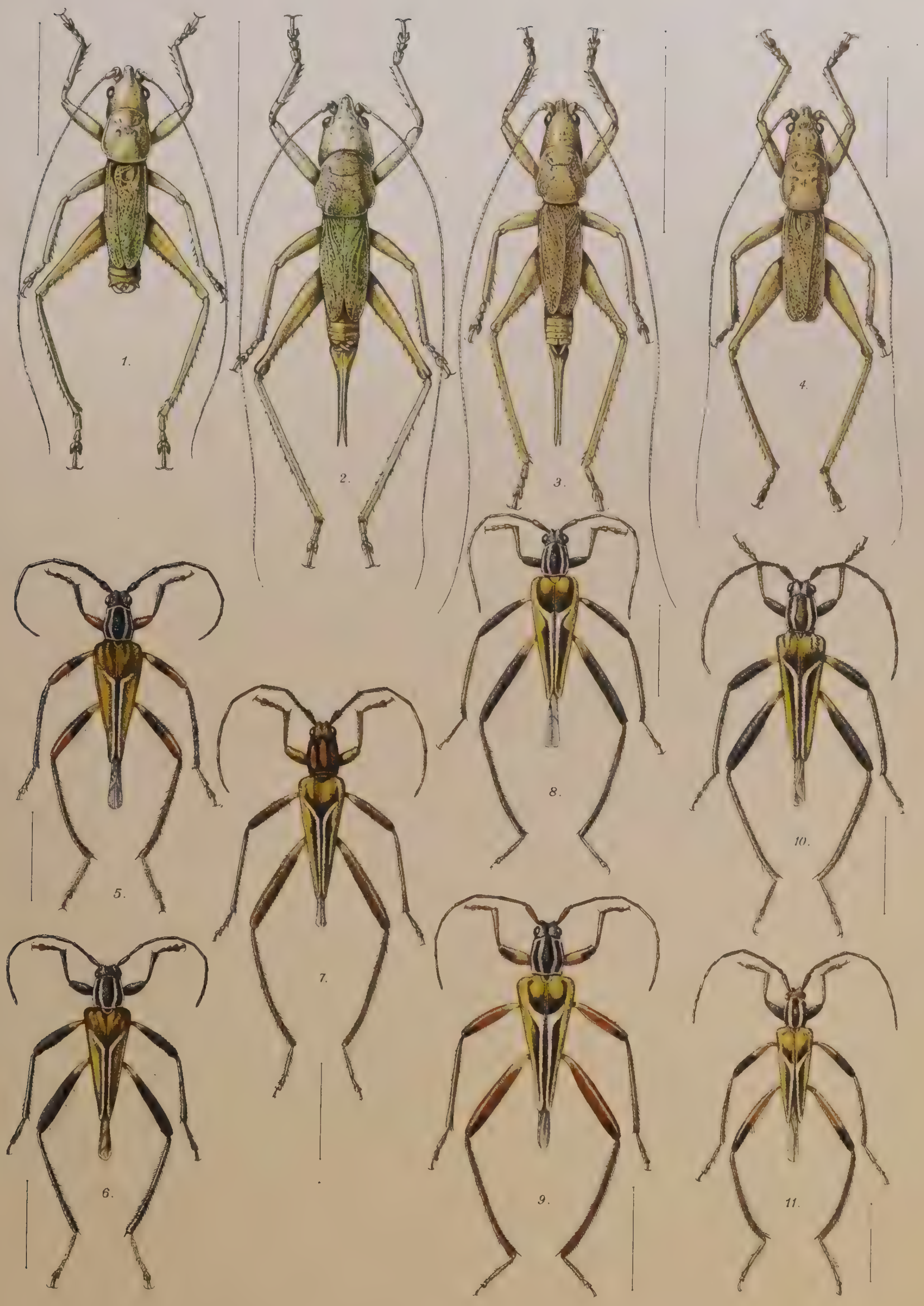
DESCRIPTION OF PLATE XV. (INTRODUCTION.)

Figs. 1 and 2. *Banza* (*Brachymetopa*) *blackburni*, typical form.
Figs. 3 and 4. *Banza blackburni discolor.*

For remarks on these forms see ante p. lxix and ccxv.

Figs. 5 and 6. *Plagithmysus varians.*
Fig. 7. *P. darwinianus.*
Figs. 8 and 9. *P. lamarckianus.*
Figs. 10 and 11. *P. blackburni.*

For remarks on these species see ante p. lxix and cxvii.



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Insects, Orthoptera & Coleoptera.

DESCRIPTION OF PLATE XVI. (INTRODUCTION.)

Fig. 1. *Nesodynerus vittativentris.*
Fig. 2. *Odynerus pseudochromus.*
Fig. 3. *Nesodynerus rudolphi.*
Fig. 4. *Odynerus dubiosus.*
Fig. 6. *Odynerus sandwichiensis.*

These species represent the five chief colour groups of Hawaiian Eumenidae (see ante p. xciii).

Fig. 5. *Xenocrabro distinctus notostictus* (♀).
Fig. 7. *X. distinctus* (♀).

For remarks on these forms see ante p. lxxxvii.

Figs. 11—16. Variation of *Xyletobius proteus.*
Fig. 8. *Nesoprosopis perspicua* of Kauai.
Fig. 9. *N. setosifrons* of Hawaii.
Fig. 10. *N. anomala* of Oahu.

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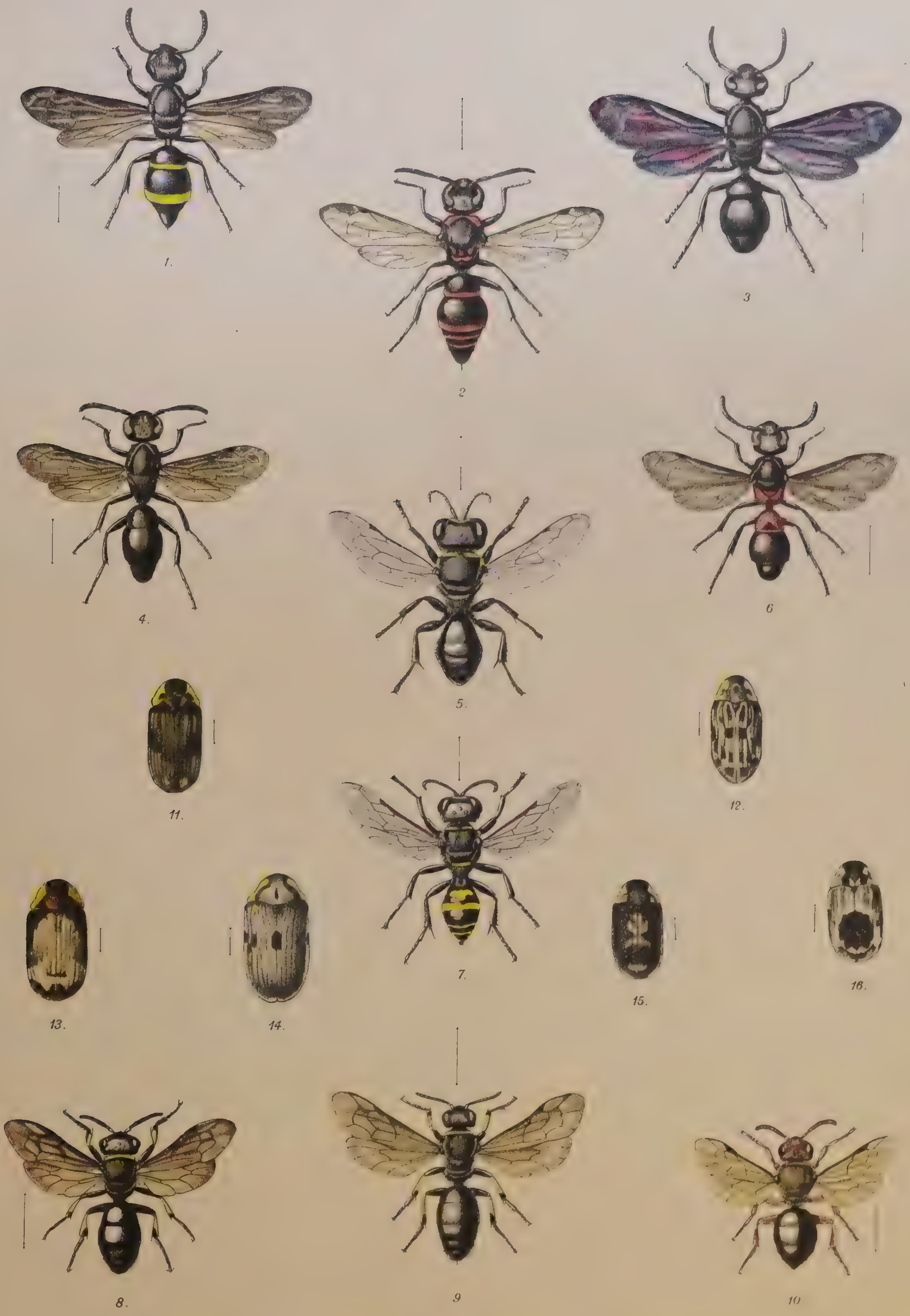
INTRODUCTION. PLATE XVI.



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